

Plaintiffs' Exhibit 8 (Redacted)

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA**

Alexandria Division

UNITED STATES, et al.,)	
)	
Plaintiffs,)	
v.)	No. 1:23-cv-00108-LMB-JFA
)	
GOOGLE LLC,)	
)	
Defendant.)	

**DECLARATION OF ROBIN S. LEE
IN SUPPORT OF PLAINTIFFS' OPPOSITION TO
GOOGLE'S MOTION FOR SUMMARY JUDGMENT**

Robin S. Lee, PhD., being duly cautioned, declares as follows:

1. I am over 21 years old and am competent to testify about the matters in this Declaration based on my personal knowledge.
2. Attached hereto as Exhibit A is a true and correct copy of the December 22, 2023, Expert Report of Robin S. Lee, PhD. Attached hereto as Exhibit B is a true and correct copy of the February 13, 2024, Expert Rebuttal Report of Robin S. Lee, PhD, along with associated errata. Attached hereto as Exhibit C is a true and correct copy of the March 4, 2024, Expert Supplemental Report of Robin S. Lee, PhD.
3. I authored the attached Expert Reports identified in Item (2) above and understood at the time I signed them that they were being prepared for use in this litigation. I am prepared to testify at trial, under oath, to the matters set forth in these reports. My statements set forth in these reports, as modified by associated errata, are true and correct to the best of my knowledge.
4. The exhibits attached to the reports described in Item (2) are true and correct copies.

I declare under penalty of perjury that the foregoing statements in this Declaration are true and correct.

Dated: *May 10, 2024*

Signed: 

Robin S. Lee, PhD.

County and State: *SUFFOLK COUNTY, MA*

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
Alexandria Division**

United States of America, *et al.*,

Plaintiffs,

v.

Google LLC,

Defendant.

Case No. 1:23-cv-00108-LMB-JFA

Hon. Leonie H. M. Brinkema

EXPERT REPORT OF ROBIN S. LEE, PHD

December 22, 2023

that I relied upon in forming my opinions. I reserve the right to incorporate new materials or data into my analysis, if and when they become available.

- (11) Bates White is compensated at a rate of \$765 per hour for my work in this matter. Neither Bates White's compensation nor my compensation is in any way contingent on the outcome of this case.

I.D. Summary of opinions

- (12) I have reached the following opinions in this matter:
1. Publisher ad servers, ad exchanges, and advertiser ad networks that serve and transact open-web display advertising are relevant antitrust product markets for evaluating Google's market power and the competitive effects of the conduct that is the focus of my report. For each relevant product market, both worldwide (excluding a limited number of countries and regions, including the People's Republic of China) and the United States are relevant geographic markets.
 2. Google possesses substantial market power in each of the relevant markets, protected by significant barriers to entry. It has possessed that market power in each of the relevant markets in recent years, and likely since at least 2015.
 3. Google has used its market power within and across the relevant markets to exclude competitors from participating in these markets, and to impede their ability to compete for customers. Google has done so by:
 - (1) Providing unrestricted access to Google Ads' advertiser demand exclusively to its AdX ad exchange, and denying comparable access to rival ad exchanges;
 - (2) Providing access to and use of real-time bids from AdX exclusively to its DFP publisher ad server, and denying comparable access to rival publisher ad servers;
 - (3) Providing access to a feature known as "Dynamic Allocation" exclusively to AdX within DFP, granting AdX valuable "first-look" and "last-look" advantages over rival ad exchanges;
 - (4) Eliminating publishers' ability to use variable pricing floors within DFP, impairing their ability to work with rival ad exchanges and exert competitive pressures on AdX;
 - (5) Acquiring an emergent competitor, AdMeld, and eliminating it as a competitive threat to Google's AdX and DFP products.
 4. These actions have harmed and continue to harm the ability of rival publisher ad servers, ad exchanges, and advertiser ad networks to compete for advertiser spending and publisher impressions. These actions have also denied scale to Google's rivals in each of the relevant markets, which is important for the competitiveness of ad tech products.

5. Google's actions harm competition and have enhanced and maintained Google's market power in the relevant markets. Google's actions have also harmed open-web display publishers and advertisers, and have also likely harmed consumers.

I.E. Summary of report

- (13) Competition encourages firms to provide higher quality and lower priced products, and to innovate and adapt in ways that create customer value. For these reasons, competition policy in the United States seeks to preserve competition by prohibiting firms from using their established dominance to distort or impede competition and block competitive threats from rivals, while preserving incentives to improve products in ways that benefit customers.
- (14) *Monopolization* refers to conduct that creates or maintains a firm's substantial market power over its products by harming competition. The most common methods of monopolization undermine the ability of customers to transact freely with rivals, and the ability of rivals to serve those customers' needs. These methods typically exclude rivals from competing for segments of a market by hindering customers from using their products, depriving them of or degrading access to important inputs, raising their costs of operation, or worsening the quality of their products.
- (15) In this report, I conduct an economic inquiry into whether Google has engaged in (and continues to engage in) conduct that harmed competition and served to acquire, maintain, or enhance Google's market power over technology products used to transact open-web display advertising on websites ("ad tech products"). The customers potentially impacted by its actions are *open-web publishers* (website operators that do not own and operate their own ad-tech products) and *advertisers* seeking to transact open-web display advertising.
- (16) My economic inquiry involves four steps:
 1. First, determining whether Google's conduct excluded existing or potential rivals from, or impeded their ability to compete for, publisher impressions and advertiser spending, thereby harming their competitiveness;
 2. Second, evaluating whether Google's conduct preserved or enhanced Google's market power;
 3. Third, evaluating whether Google's conduct has harmed customers (open-web publishers and advertisers);
 4. Last, examining whether pro-competitive justifications for the scrutinized conduct exist. If so, then investigating whether any pro-competitive benefits could have been realized via less-restrictive or less-exclusionary means (in which case such benefits are not specific to the

II.A.1. Ad tech products for display advertising and their customers

- (51) “Ad tech,” short for advertising technology, refers to software and other tools used to purchase, sell, and manage digital display advertising. I refer to companies offering ad tech products as ad tech intermediaries.
- (52) Customers of ad tech products are advertisers and publishers of online content. Advertisers attempt to cost-effectively target their display ad campaigns at what they perceive to be high-value audiences, while publishers often seek to monetize their digital assets by selling online ad space on their websites, also referred to as their display ad “inventory.”²⁸ Because advertisers are buyers and publishers are sellers of display ad inventory, advertisers are said to be on the “demand-side” (or “buy-side”) while publishers are on the “supply-side” (or “sell-side”).
- (53) A variety of ad tech products work in conjunction with one another to facilitate display advertising transactions between publishers and advertisers. These products form what is known as the “ad tech stack.” At a high level, the ad tech stack can be described as comprising three “layers” consisting of ad tech products that each serve different functions:
- publisher ad servers;
 - ad exchanges; and
 - advertiser bidding tools, comprising both demand-side platforms (“DSPs”) and advertiser ad networks.²⁹
- (54) The purchase of a single online display ad “impression” (i.e., a single display ad shown to a single web visitor) by an advertiser from a publisher often involves participation by products in each of these layers. I describe these ad tech products in more detail in Section II.B.
- (55) The focus of this report is ad tech products for display ads that are shown on websites, so unless otherwise specified, I will use the term *publishers* to refer to entities that operate online web pages and display content to web visitors. These publishers often monetize their web traffic by devoting some of the space on their web pages to display advertising. I will use the term *open-web publishers* to refer to those publishers that rely on third-party ad tech products (i.e., products that these publishers do not themselves own) to sell their display ad inventory.³⁰ Examples of large open-web publishers are USA Today, Weather.com, and Vox. In contrast, there are other publishers, including

²⁸ There are some forms of display ads that do not appear on websites, a notable example being in-app display ads. As I explain in Section IV, in-app ads are a distinct form of advertising from open-web display ads. Google also distinguishes between display, video, and in-app inventory. *See* GOOG-DOJ-AT-02199478, at -485 (06/2019).

²⁹ Certain ad networks can also be used to connect advertisers and publishers without relying on exchanges or publisher ad servers. *See* Section II.B.2.b.

³⁰ Unless otherwise specified, I use “publishers” in this report to mean “open-web publishers,” as these are the publisher customers of the ad tech products that are the focus of this report.

Amazon and large social media publishers such as Facebook, that sell their owned and operated (O&O) display ad inventory to advertisers through their own integrated, internally supplied ad tech tools (“integrated advertising tools”).³¹

- (56) In my report, I use “open-web display advertising” to refer to display ads shown on the websites (which can be viewed on desktop or mobile devices) of open-web publishers. This excludes other forms of digital advertising (including search and instream video), and display ads that are shown in applications used on mobile devices or on TV media players.³² Similarly, unless otherwise specified, I use the term *advertisers* in this report to refer to entities that purchase display advertising inventory.
- (57) Even though website visitors and hence viewers of display ads (“users” or “consumers”) are not direct customers of ad tech products, they too can be affected by changes in the quality or cost of display advertising. For example, users may benefit if display ads become more “relevant,” which can mean that ads more frequently contain valuable information for consumers. They may also benefit if increased monetization from display advertising allows publishers to fund the creation of new content. On the other hand, users can be made worse off if display advertisements become less relevant, rely on more personal data, become more expensive and lead to higher final prices of goods or services, or if publishers earn less from the sale of online display inventory and therefore are less able to produce valuable content.

II.A.2. Uses of different forms of digital advertising

- (58) Companies use advertising to achieve a variety of goals. Potential goals include building awareness for a company’s products or brand, communicating a product’s attractiveness compared to alternatives (“consideration”), or acquiring a new customer and inducing them to make a purchase (“conversion”).³³ These and other roles played by advertising are often described by marketers as corresponding to different stages of a consumer’s “journey” toward making a purchase. Marketing

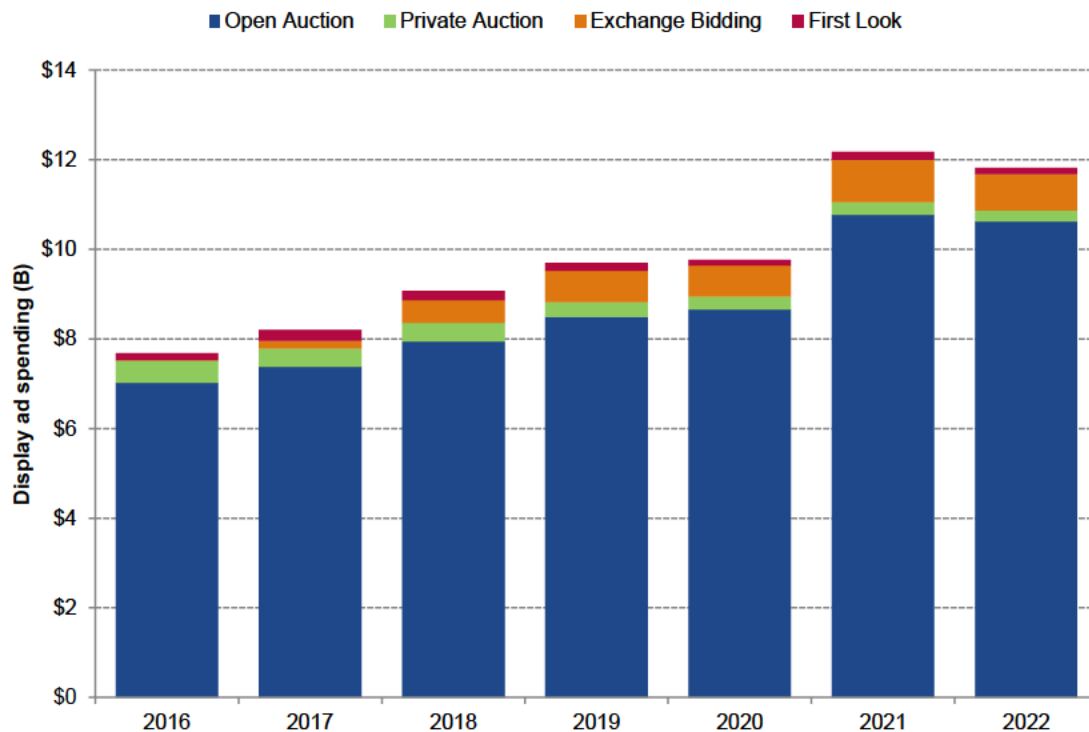
³¹ In a strategy document, Google described Facebook and Amazon as “typically requiring purchase through their buying door” in order to secure advertising inventory on their pages and referred to them as “[e]stablished walled gardens.” See GOOG-AT-MDL-001970341, at -348 (08/2021). See also GOOG-TEX-00151409, at -409 (08/18/2017) (describing Amazon and Facebook’s “walled garden inventory” and access to “open ecosystem inventory”); GOOG-DOJ-04442323, at -350 (2018), (describing Amazon and Facebook as part of “unaddressable” web inventory for Google’s display business).

³² Apple and Android smartphones and tablets are examples of mobile devices, and Roku, AppleTV, Amazon’s Fire TV, and Google’s Chromecast are examples of TV media players.

³³ Philip Kotler and Kevin Lane Keller, *A Framework for Marketing Management*, 6th ed. (Pearson Education, 2016): 122. (“Some people are unaware of the product, some are aware, some are informed, some are interested, some desire the product, and some intend to buy... [M]arketers can employ a marketing funnel to break the market into buyer-readiness stages.”). See also Deposition of Kristy Kozlowski (Comcast), September 6, 2023, 186:8–186:13 (“Q. And what are the different parts of the [marketing] funnel? A. The top of the funnel would be more brand and awareness driving, the mid-funnel would be more consideration and the lower funnel would be more conversion.”); See also Amazon Ads, “What is a marketing funnel? How they work, stages, and examples,” Amazon Ads, accessed December 18, 2023, <https://advertising.amazon.com/library/guides/marketing-funnel> (describing a “four-stage marketing funnel” including the stages of “awareness, consideration, conversion, and loyalty.”)

Expert Report of Robin S. Lee, PhD

Figure 17. Worldwide indirect programmatic spending on open-web display advertising by transaction type through Google's AdX and AdSense products (2016–2022)



Source: Google XPP-M data (DOJ RFP 7).

Notes: Revenues are limited to web transactions through Google's AdX and AdSense and exclude transactions with "missing" or "unknown" transaction types. "Open Bidding" or "Exchange Bidding" is a program introduced by Google (described in more detail in Section II.E.4) and can include both Open Auctions as well as Private Auction transactions. First Look is a Google product that publishers can use to sell inventory ahead of its guaranteed inventory.

II.B. Ad tech products used for web display advertising

- (79) Multiple ad tech products, or "components," are used by publishers and advertisers to serve, manage, and transact display advertising.
- (80) Figure 18, based on a June 2020 Google presentation, provides a simplified depiction of the primary ad tech components. Publishers (i.e., sellers) are on the left-hand side, advertisers (i.e., buyers) are on the right-hand side, and ad tech products are in the middle. The diagram shows different sets of ad tech products, including publisher ad servers, ad exchanges, advertiser ad networks, and demand-side platforms. The diagram also highlights Google's products, which I discuss further in Section II.C.

- (101) Examples of advertiser ad networks for web display advertising include Google Ads and Criteo.¹¹² Meta Audience Network (formerly Facebook Audience Network) facilitated advertising transactions to open-web publishers until 2020, when it shifted focus to advertising on Meta O&O properties and select third-party mobile apps.¹¹³
- (102) Ad networks, like Google's Display Network with *AdSense*, may also have a publisher-facing component used by open-web publishers to sell display inventory. I describe AdSense in further detail in Section II.C.3.b below.

II.B.3. Ad exchanges

- (103) Ad exchanges (also previously referred to as supply side platforms, or "SSPs") are software products that run real-time auctions for publishers' display ad inventory.^{114, 115} Publishers can sell display ads through ad exchanges via a publisher ad server, and advertisers can bid on those impressions using DSPs and advertiser ad networks.
- (104) Ad exchanges can improve the matching of impressions between publishers and advertisers, and increase payouts for publishers relative to non-RTB indirect deals by allowing advertisers to bid in real-time.¹¹⁶ They also provide additional control and targeting to both publishers and advertisers:

¹¹² A 2018 Google document describes Criteo as a "[c]ompetitive performance ad network" and lists Facebook Ads (no longer active in open-web display) as the only other display ad network competitor. *See* GOOG-AT-MDL-003977297 ("Buyside Deep Dive") at -312 (03/13/2018). *See* Section V.D.

¹¹³ Allison Schiff, "Facebook is Killing Off Its Web Supply In Audience Network – And Don't Be Surprised If It All Shuts Down," *adexchanger*, February 5, 2020, <https://www.adexchanger.com/platforms/facebook-is-killing-off-its-web-supply-in-audience-network-and-dont-be-surprised-if-it-all-shuts-down/>. *See also* Meta, "Changes to Web and In-stream Placements," <https://www.facebook.com/business/help/645132129564436>; Meta, "Meta Audience Network," <https://www.facebook.com/audiencenetwork/> and discussion in Section V.B.2.b.

¹¹⁴ While previously distinct, SSPs and ad exchanges today are often used to refer to the same set of products. GOOG-DOJ-04429792 ("Monetization Cheatsheet" presentation) at -795 (03/27/2017) ("Sell Side Platform (SSP)/Exchange – service for managing multiple programmatic monetization sources of online display inventory, DSP and ad networks are considered 'Buyers', and publishers and publisher networks are considered 'Sellers'. Google Exchange is called AdX"). *See also* GOOG-DOJ-AT-02199478 ("Ad Manager Ecosystem 101" presentation) at -481(06/2019) ("SSP is a publisher tool that lets them configure rules that (Ad) Exchanges must adhere to on the publisher inventory. For example: publishers can set advertisers they don't want on their sites (for example competitors) and they can set minimum prices for which ads can be bought (to protect direct ad sales)[.] Often SSP and Exchange are bundled as one product and both names are used interchangeably"); Ryan Joe, "Defining SSPs, Ad Exchanges and Rubicon Project," *AdExchanger*, Feb. 7, 2014, <https://www.adexchanger.com/yield-management-tools/defining-ssps-ad-exchanges-and-rubicon-project/> ("The distinction between an ad exchange and a supply-side platform (SSP) has become muddled as the once disparate but complementary technologies have merged."). *See also* Michal Wlosik and Maciej Zawadzinski, "What is a Supply-Side Platform (SSP) and How Does It Work?," *Clearcode*, October 18, 2018, <https://clearcode.cc/blog/what-is-supply-side-platform/>.

¹¹⁵ While certain exchanges such as Google's AdX have begun to facilitate programmatic direct transactions, ad exchanges have primarily fulfilled indirect deals via RTB auctions. In 2022, fewer than 4% of impressions and less than 14% of spend transacted by exchanges that produced data sufficient to identify transaction type in this matter were transacted through direct transactions.

¹¹⁶ A 2018 Google presentation noted that RTB transactions offered publishers "[h]igher eCPMs" and allowed advertisers to "[t]arget and buy only the advertising they want, at an appropriate value". *See* GOOG-DOJ-03242646, at -666 (09/29/2018).

publishers can adjust minimum prices for their inventory and manage which advertisers are allowed to purchase their inventory, and advertisers can target particular publication and consumer characteristics at a specific per-impression price.¹¹⁷

(105) The process through which an impression is sold through an ad exchange can be summarized as follows:¹¹⁸

1. When an internet user browses the publisher's website, available impressions on that web page, as well as data about the user, are sent from a publisher's ad server to the ad exchange for auction.
2. The ad exchange sends bid requests to various demand sources, which include DSPs and advertiser ad networks.
3. Demand sources determine whether to bid on the impression and, if so, how much to bid.
4. The ad exchange then evaluates all bids received on the basis of whether the bid meets criteria set by the publisher. For example, a publisher could specify that they do not want to show ads from their competitors.¹¹⁹
5. After restricting to bids that meet the publisher's criteria, the ad exchange then selects the bidder with the highest bid (typically running either a first- or second-price auction)¹²⁰, and sends the winning bid to the publisher's ad server. In certain circumstances, bids from the ad exchange can compete with direct-sold ads and bids from other exchanges and networks within the publisher ad server.¹²¹

(106) Publishers that use exchanges often use multiple exchanges within their publisher ad servers.¹²²

¹¹⁷ GOOG-DOJ-03242646, at -665, -666 (09/26/2018).

¹¹⁸ GOOG-DOJ-AT-02199478, at -488, -500, -501 (05/26/2021). *See also* Irina Kovalenko, "What is an Ad Exchange?," Programmatic 101, January 30, 2017 <https://smartyads.com/blog/what-is-an-ad-exchange/>.

¹¹⁹ Google, "Protections overview," Google Ad Manager Help, accessed December 18, 2023, <https://support.google.com/admanager/answer/2913553>.

¹²⁰ In both a first- and second-price auction, the winner is the highest bidder as long as the highest bidder clears the minimum price the seller is willing to accept, which is known as the reserve or "floor" price. If no one clears the reserve price, no one wins the auction. The difference between the two auction formats if there is a winner is that in a first-price auction, the winner pays her bid; in a second-price auction, the winner pays the higher of the second-highest bid or the reserve price. *See* Section III.E for additional detail.

¹²¹ For example, as I explain in Section II.E.2, Google's Dynamic Allocation allows bids from its ad exchange to compete with direct-sold deals. In Section II.E, I provide further detail on how publisher ad servers select among competing ad sources.

¹²² GOOG-DOJ-04329872, at -872 (11/10/2015) (In a November 2015 email exchange, Eisar Lipkovitz wrote that many publishers "wouldn't want to go exclusive with any SSP"). *See* Deposition of Scott Sheffer (Google), July 20, 2021, 149:20–151:24. *See also* Deposition of Tim Craycroft (Google), August 15, 2023, 143:10–143:17 ("most publishers using SSPs are using three, four, five of them at a time."). Mr. Craycroft is currently a Vice President and General Manager at Google who is "responsible for YouTube ads...Google Display ads, Google app ads, [and] publisher products, including Google Ad Manager, AdSense, [and] AdMob. Deposition of Tim Craycroft (Google), August 15, 2023, at 28:2–28:16.

display advertising is differentiated from other forms of advertising from advertisers' perspectives.

- In Section IV.B.3, consistent with the above, I show evidence that Google and other industry participants recognize important distinctions between open-web display advertising and other forms of advertising.
- In Section IV.B.4, I discuss why indirect transactions, and RTB transactions in particular, for open-web display advertising provide additional distinct value to publishers and advertisers compared to direct transactions.

IV.B.1. Open-web display advertising is an important and distinct form of monetization for publishers

- (265) Open-web publishers relying on advertising to monetize their digital content often use a portfolio of different forms of advertising.³⁵² In this Section, I discuss why open-web display advertising forms an important part of the monetization portfolio for open-web publishers, and why such publishers will tend to have limited ability to substitute away from display advertising to other forms of advertising. I also discuss why open-web publishers without their own integrated ad tech products cannot easily substitute to using integrated advertising tools to sell display advertising.
- (266) Note that open-web publishers that monetize at least some of their web inventory via digital advertising would not likely find substituting completely away from advertising to a consumer-payment model (e.g., subscriptions) to be a close substitute. For publishers that do not currently have a consumer-payment model, adopting a new monetization strategy can be costly and difficult.³⁵³ In particular, a publisher that attempts to adopt a consumer-payment model from scratch must induce consumers to pay for its content, market its product to new customers, and deliver enough value to keep its customers paying. For publishers that already have a consumer-payment model, substituting completely away from advertising would mean forgoing a valuable source of additional revenue.

IV.B.1.a. The sale of display advertising is distinct from other forms of advertising from the perspective of open-web publishers

- (267) From the perspective of open-web publishers, the sale of display advertising is distinct from selling other forms of advertising. There are two primary reasons for this. First, a publisher may not have content that is suitable for other forms of advertising, such as instream video or in-app content.

³⁵² See Section IV.A.2.

³⁵³ As one academic paper notes, so-called “free-to-free” changes between advertising to subscription-based models are challenging for publishers because of the tendency of consumers to place a lower value on free (or discounted) content and resist paying for content that had been free (or discounted). Pontus Huotari and Paavo Ritala, “When to Switch between Subscription-based and Ad-sponsored Business Models: Strategic Implications of Decreasing Content Novelty,” *Journal of Business Research* 129 (2021), 14–28.

Second, even among the set of advertising options available to a publisher given its content, there is significant differentiation between display advertising and other forms of advertising.

IV.B.1.a.i. Publishers' advertising options are limited by the content they provide

- (268) A publisher's options for using advertising to monetize a particular piece of online content is limited by the nature of the content itself.
- (269) Perhaps most obviously, a publisher with *online* content cannot generally sell *offline* advertising to directly monetize that online content. Similarly, publishers cannot monetize their *web* properties by selling *in-app* ads.³⁵⁴ Offline and in-app ads fundamentally monetize different advertising inventory than web ads.
- (270) Additionally, even within web advertising, selling certain forms of digital advertising may not be available as an option to certain publishers based on the content or nature of their online business. For example, selling search ads is limited to publishers that display search result pages, selling in-feed social media ads is limited to publishers with social media content, selling instream video ads is limited to publishers with video content, and the use of sponsored listing or sponsored product ads is limited to publishers that provide product listings.³⁵⁵

IV.B.1.a.ii. Display advertising is differentiated from other available options from a publisher's perspective

- (271) Even for publishers who have advertising options other than display advertising for the content they offer, display advertising is significantly differentiated from other forms of digital advertising.
- (272) **Instream Video.** For publishers that do provide video content (potentially alongside "static" content), instream video ads and display ads are substantially different. This is for several reasons. First, instream ads are shown within a video player whereas display ads (including outstream video ads) are

³⁵⁴ Many online publishers also do not have a mobile app: Google data show that in 2022, 83% of AdX web publishers sold no mobile app or tablet app impressions (Google XPP-D data (DOJ RFP 7)). This figure excludes transactions where Google sold its owned-and-operated inventory through AdX.

³⁵⁵ See GOOG-AT-MDL-003299671, at -673 (06/24/2021) (Google presentation "Sponsored Product Ads Project Guilder," June 24, 2021: "[Sponsored product] ads are ads that appear on a retailer's app or site, natively in search results, category pages, or product pages."); see also Deposition of Todd Parsons (Criteo), September 8, 2023 ("Q. ...How does Criteo pitch its publisher ad server to publisher customers? A. The way that we -- that we pitch our ad server is to retailers who are looking to participate in retail media and commerce media. The way that we're pitching the server actually twofold; one is to help the retailer run what are called "sponsored product listings" on their website. Those are the listings that exist when you navigate to a product page, and an alternative product is sponsored and presented which you would see on Amazon, for instance. And then there is a second case which is we might serve a display advertisement on the retailer website along with a sponsored product or not. And that's a -- that second case is a little closer to the GAM execution, but we're talking about in the retail environment. Q. So is Criteo's publisher ad server focused on retail publishers? A. That's correct").

typically shown in “banner” ad locations at the top or side of publishers’ webpages.³⁵⁶ Thus, instream video and display ads occupy different parts of a publishers’ digital ad inventory.

- (273) Second, there are substantial price differences between open-web display ads and instream video ads. Testimony from Disney Executive Vice President of Advertising and Data Platforms Jeremy Helfant notes that there are substantial price differences between display and instream video advertising on Disney sites.³⁵⁷ My analysis of Google data also shows that instream video ads have consistently higher average CPM than display advertisements: in 2022, the average CPMs for DV360 and Google Ads were [REDACTED] and [REDACTED] for instream video ads and [REDACTED] and [REDACTED] for display ads, respectively.³⁵⁸
- (274) These price differences are consistent with instream video and display ads not being close substitutes from publishers’ perspectives, and there being constraints on publishers’ abilities to re-allocate their advertising space away from display ads and toward instream video ads to take advantage of the higher monetization rate.
- (275) **In-app.** As discussed above, even for publishers that have both a mobile application and a web site, in-app and open-web display advertising are not close substitutes. This is primarily because *in-app* display ads cannot monetize the publisher’s *web* inventory (and vice versa); such a publisher would likely use both in-app and open-web display ads if it chose to monetize its digital properties with display advertising. Additionally, web impressions and app impressions for such publishers may attract different audiences and users.³⁵⁹ Among publishers using AdX who offer both web and mobile app inventory, the average share of impressions derived from web pages in 2022 is 60%.³⁶⁰ Forgoing open-web advertising would mean forgoing additional advertising sales for those web impressions.

³⁵⁶ Deposition of Jeremy Helfant (Disney), September 9, 2023, 103:7–104:5 (“Q. You also mentioned there’s differences in the experiences for consumers between display advertising and video advertising. Can you explain what you mean there? A. I mean just in terms of how the -- the advertisement is integrated into the content experience. Display is normally sitting adjacent to content, whether it’s, you know, on the page, or in an article, something like that. For video, the vast majority of our video is instream, meaning it’s interspersed throughout the content... Q. Are these differences between display and video advertising unique to Disney? A. No. Q. Is it common within the industry to delineate between display and video advertising? A. Yes.”).

³⁵⁷ Deposition of Jeremy Helfant (Disney), September 9, 2023, 102:10–21 (“Q. I want to walk through some of the distinctions you just drew between display and video advertising. You said they were differently priced. What are the differences in prices between display advertising and video advertising? A. Roughly speaking, when you’re referring to video, video is typically somewhere in -- in a premium content environment, in the, you know, could go anywhere from the mid teens, as high as you know, [REDACTED] or [REDACTED] per thousand impressions. In display, you’re typically talking about sub-[REDACTED] CPM. So you’re talking about cents per thousand typically.”).

³⁵⁸ “Display” includes outstream videos and videos with unknown instream/outstream status. These figures reflect average payments collected by bidding tools from advertisers and are calculated using RFP 7 Google Ads and DV360 and RFP 54 Google Ads data. I exclude advertisers from China and countries and regions where Google is prohibited from operating due to US sanctions and limit to indirect transactions for web or unknown channel impressions.

³⁵⁹ See Section II.A.2, IV.B.1.a, IV.B.2.b.

³⁶⁰ Google XPP-D data (DOJ RFP 7).

- (276) **Native.** Web publishers could also in theory use some forms of native advertising, in particular content recommendation ads, to monetize their content. These ads are characterized as having different look and feel, and are meant to “blend into” publishers’ content.³⁶¹
- (277) In practice, publishers often use display and content recommendation ads together, deploying them in different parts of their webpages. For example, partly due to quality issues and the provision of “clickbait ads,” publishers often use content recommendation ads at the bottom of articles, and not at the top of pages: as a 2017 Google document noted, “Because the minimum quality bar is set somewhere around “it makes me sick to my stomach” (real publisher quote), publishers typically relegate [content recommendation] ad units to the bottoms of articles.”³⁶² Similarly, in-feed native ads are distinct from display ads because they occupy slots *within* (as opposed to above and around) publishers’ content.³⁶³
- (278) Further highlighting the distinction between display and content recommendation ads, Google offered a separate type of advertising unit within AdSense called Multiplex ads (formerly called Matched Content)³⁶⁴ that it lists as distinct from display and describes as a “grid-based ad unit that shows content recommendation-style native ads.”³⁶⁵ Figure 10 in Section II.A shows an example of Google’s

³⁶¹ GOOG-AT-MDL-000994606, at -679 (11/05/2020) (A Google presentation on “Ad Formats and Competition” notes that native ad units “are not recommended outside of main content” where banner ads would typically be placed: “If you’re considering Native Ads outside of main content: native ads don’t perform as well here because they’re meant to blend into content, not be outside of it”). *See also* GOOG-DOJ-13606751, at -761–763, (01/15/2015) (Notes that display ads “takes the user out of context (interrupt based)” as opposed to content recommendation ads); GOOG-AT-MDL-014374858, at -930 (n.d.) (“Given the nature of its platform, FB and IG [Instagram] offer native ads that do not meaningfully disrupt the user experience, allowing aggressive ad load management”); GOOG-AT-MDL-000994606, at -679 (11/05/2020) (“We strongly encourage publisher to use our templates as a starting and to involve their design and engineering teams in the process... When a native ad is in a feed it should very closely match your site/apps layout. Plan on starting with a pre-made template but making significant edits to the CSS for layout, font, and styling.”); GOOG-AT-MDL-008909788, at -872 (05/17/2018) (“In a meaningful way, native ads shift the burden of design from advertisers to publishers.”).

³⁶² GOOG-AT-MDL-003644990, at -995 (05/23/2017) (“Over the past several years the web has seen a proliferation of content recommendation ad units from three main companies: Taboola, Outbrain, and RevContent (TBOBRC)... These companies have grown enormously by peddling clickbait ads (sometimes scams and often NSFW) that generate high CTRs and CPMs for publishers... Because the minimum quality bar is set somewhere around “it makes me sick to my stomach” (real publisher quote), publishers typically relegate [content recommendation] ad units to the bottoms of articles. However the same publishers describe the revenue (often in the form of a guaranteed CPM) as ‘like crack’ which is why so few have chosen to abandon these ad units.”). *See also* GOOG-TEX-00800853, at -858 (04/2017) (“The problem I find with Taboola and Outbrain is that they bring really, really junk results... so you can write about technology but you get ads for celebrities and, you know... it’s really junk, I really hate it”) and at -862 (“I tried Taboola... I removed it because it was all this junk content. I didn’t like it... but I was making some extra money”).

³⁶³ *See* Section II.A.

³⁶⁴ *See* GOOG-AT-MDL-0022638681, at -682 (01/14/2019) (Google proposal “Matched Content in AdSense (2019 strategy proposal)”: “Matched Content launched in AdSense mid-2015 in response to growing content recommendation networks such as Taboola (TB) and OutBrain (OB).”).

³⁶⁵ Google, “About ad units,” Google AdSense Help, <https://support.google.com/adsense/answer/9183549>. *See also* GOOG-AT-MDL-003644990, at -997 (05/23/2017) (A Google document titled “Content Recommendations (CoRe) in DRX – PRD” reads “AdSense has built a [Content Recommendation] product (publicly called ‘Matched Content’) that competes head to head with TBOBRC [Taboola, Outbrain, and RevContent]”) and GOOG-AT-MDL-003644990, at -990 (05/23/2017) (“An all-ads version of this has been built, and dubbed Multiplex”). Per Google, “Traffic Multiplex ads (retired),” Google Ad Manager Help, <https://support.google.com/admanager/answer/9428537?hl=en>, (Multiplex was

Multiplex product. Google documents identify Outbrain, Taboola, and Revcontent—firms without substantial business in open-web display advertising—as the main competitors for this content recommendation product.³⁶⁶ Google presentations also present market shares and compares features among this set of competitors.³⁶⁷ Google documents indicate that it recognized that publishers view its Multiplex ads product as a closer substitute to other content recommendation products than to display products.³⁶⁸

IV.B.1.b. Open-web publishers cannot easily substitute to selling display advertising inventory with their own integrated advertising tools

- (279) Open-web publishers rely on third-party ad tech products to sell their ad inventory. Other publishers, including Facebook, Twitter and Amazon, use their own integrated ad tech products to sell ads.³⁶⁹ Publishers with more specific advertising requirements, such as social media websites selling in-feed ads, or publishers desiring more control over user data shared with third parties, may find benefits from developing their own integrated ad tech products.³⁷⁰

retired in July 2023).

³⁶⁶ See GOOG-DOJ-05285783, at -792 (06/2017); see also GOOG-AT-MDL-019001843, at -845, -853–857, and -888–889 (08/10/2016); see also GOOG-AT-MDL-003644990, at -995 (05/23/2017).

³⁶⁷ See GOOG-AT-MDL-019001843, at -853–857 (08/10/2016); see also GOOG-AT-MDL-019427179, at -181 (02/2018).

³⁶⁸ See, e.g., GOOG-DOJ-12449378, at -397 (08/10/2016) (“For matched content, we have some partners who compete us with Taboola/Outbrain in DFP. And they might not continue to use matched content if they were forced to HC [hard-code] one [...] i.e. they’d just hard-code Taboola / Outbrain.”).

³⁶⁹ Before Facebook exited open-web display with its Facebook Audience Network product, in a 2018 presentation it noted, “Supply-acquisition is highly dependent on the ad tech that a publisher uses. All publishers use ad tech (ad server mediation platform/supply-side platform) to facilitate transactions between demand sources (like AN) and their available ad impressions. Publishers either build their own ad tech (Twitter, Rovio, Snap) or use 3rd party vendors like Google DFP, Google AdMob and MoPub. By revenue, we estimate that [REDACTED] of our addressable market flows through 3rd party vendors and [REDACTED] flows through home grown solutions[.]” FBDOJ003260796, at -799 (02/05/2018).

³⁷⁰ See, e.g., Deposition of Tobias Maurer (Google), Nov. 9, 2020, 128:10–129:4 (“Q. I’m sorry, let me back up. Thank you for clarifying that. Before interfacing with Google’s demand product – or, I guess, let me just back up and have you explain for me, why, for example, for eBay, was eBay a good candidate for the demand product? A. They -- they’re very unique in that they’re not primarily -- you know, advertising revenue is only one thing that they care about. They also obviously care about selling products on eBay as a platform. So their challenge is to understand what is the opportunity cost of showing an ad as opposed to getting someone to buy a pair of shoes or, you know, something like that. And that’s something really only they can determine. So traditional ad servers didn’t really serve them well in doing that. And also they had, you know, the expertise to develop different technology in-house, so that’s why we started talking to them.”); see also Deposition of Tim Craycroft (Google), Aug. 15, 2023, 100:3–100:23 (“Q. And then you said you didn’t want to send Amazon’s data to Google, even if it was encrypted, right? A. Yep. Q. Is that because Amazon didn’t trust Google at that time? A. It’s nothing to do with Google specifically. We had the same conversations with every partner in the ad tech space. It’s about Amazon’s relationship with its own customers and maintaining trust. Q. Who else did you discuss this with? Like what other companies? A. Every SSP in the space that we would buy ads on, making sure that they weren’t attempting to learn – hey you’re serving a lot of, you know, expensive handbags to this one user on my ad exchange, so now I can learn something about them and sell that learning to someone else. We did a lot technically and with contractual protections to prevent things like that.”).

aggregation, however, includes transactions of non-open-web display ads, such as in-app ads sold through AdX and display and instream video ads sold through connected TV.⁵⁹⁰

- (418) Dr. Respass calculates that Google’s operating profit in the DVAA product area (excluding AdMob) increased from \$312 million in 2020 to \$1.185 billion in 2022.⁵⁹¹ Dr. Respass’s calculations also show negative accounting profits from 2015–2017. As a general matter, negative accounting profit (which are not based on economic opportunity costs) does not rule out the possession of substantial market power. For example, firms with substantial market power may invest profits today in order to entrench their market power and recover greater returns in the future.⁵⁹²
- (419) Given the general difficulties in comparing economic profits and accounting profits discussed above, and the challenges with mapping Google’s profits to the products contained in the relevant markets at issue in this matter, I do not rely on measures of accounting profit and instead rely on other indirect and direct evidence to evaluate Google’s market power in the relevant markets.

V.A. Sources of Google’s market power over its ad tech products

- (420) Because each of the relevant markets that I evaluate in this report are intertwined, and Google’s market power in the relevant markets in part flows from Google’s assets that lie both within and outside these markets, I begin by discussing key sources of Google’s market power across the ad tech stack. I then discuss common economic factors that increase barriers to entry in each of the relevant product markets.

V.A.1. Google’s key strategic assets

- (421) Google’s substantial market power for its ad tech products derives from several key strategic assets that Google has leveraged within the ad tech stack. The presence of indirect network effects has amplified the importance of these assets.

AwBid, the other three sellside P&Ls, all sell some open-web display ads, in addition to other ad formats like app, instream video, and display ads on platforms like connected TV and video game consoles.)”.

⁵⁹⁰ See Respass Report, Section IX.B. As I note in Section II.A, connected TV refers to “[v]ideo content consumed on a TV screen, delivered via an internet connection,” such as TV viewed via a streaming service.

⁵⁹¹ See Respass Report, Figure 30. I understand that Dr. Respass has noted in his report that Google instituted an accounting change for its DVAA segment in 2021, implying that DVAA profitability calculated before and after 2020 may not be directly comparable. See Respass Report, Section IX.A and IX.B (“Starting in 2021 (but recast back to 2020), Google began presenting individual ad tech stack product P&Ls in a ‘mutually exclusive, collectively exhaustive’ view (‘MECE’)...Figure 27 shows that because Google allocates costs differently in each of the three types of P&Ls, the three types are not comparable on a side-by-side basis over time...The buy-side, sell-side, and MECE P&Ls are three different ways of looking at the profits and profitability of products in Google’s ad stack.”).

⁵⁹² See Section VII.A.

- (422) First, Google offers unique access to O&O ad inventory including Google search and YouTube through its bidding tools. Google’s search ads, accessible through Google Ads, were already valuable digital ad inventory when it completed its acquisition of DoubleClick in 2008 and continue to be valuable today.⁵⁹³ YouTube video ads, available through Google Ads and DV360, comprise a meaningful share of online video advertising spending.⁵⁹⁴ Industry participants have recognized the value of access to Google’s O&O inventory for driving usage of Google’s ad tech products over those offered by rivals.⁵⁹⁵ These O&O properties are an important source of Google’s market power in ad tech because they serve to draw advertisers into using Google’s ad tech products.⁵⁹⁶
- (423) Second, Google benefits from its Google Ads advertisers, which Google initially gained and likely continues to maintain because of its large presence in search advertising and its control over unique small publisher inventory with AdSense.⁵⁹⁷ Google has ensured that, since AdX’s launch, AdX has

⁵⁹³ As of 2008, Search generated substantially more revenue than Google’s display business. GOOG-AT-MDL-007402944, at -955 (2009). As of 2020, Search continues to generate substantially more revenue than Google’s display business. GOOG-AT-MDL-000969513, at -514–515 (11/2020).

⁵⁹⁴ YouTube video ads used to be accessible through third-party DSPs. MSFT-LIT-0000065309, at -322 (02/01/2021). “Google announced its decision to withdraw YouTube inventory from its ad exchange on 6 August 2015, and did so via its public blog... YouTube is important ad inventory, because it accounts for approximately 50% of video ad inventory worldwide, and video ads are now a core element of nearly every ad campaign. Therefore, to access such inventory, advertisers are forced either to switch to Google’s DSP (DV360) or multi-home...”). In August 2015, Google announced that beginning in 2016, it would withdraw YouTube inventory from all DSPs besides Google’s products, Google Ads and DV360. MSFT-LIT-0000065309, at -322 (02/01/2021) (“Google announced its decision to withdraw YouTube inventory from its ad exchange on 6 August 2015, and did so via its public blog. Google implemented its decision from the start of 2016”). A June 2020 Google “Global Internal Sales Positioning” document stated that a key feature of Google Ads was access to Google O&O inventory including “Discovery, Gmail, YouTube, and more coming soon” and also that “[u]nique access to inventory across devices on Google O&O properties, including YouTube, Gmail, Maps, and more” is a reason for advertisers to buy display and video inventory on Google. GOOG-AT-MDL-000888797, at -797–798 (06/2020).

⁵⁹⁵ Deposition of John Dederick (The Trade Desk), Jul. 28, 2023, 170:13–172:7, (on advantages of Google’s products, “[A]dvantages are exclusive access to huge pools of inventory that every buyer has to have, any massive and authenticated audience that has signed up for Google properties, Gmail, Maps, Google Chrome. There are billions of registered users whose data are being monetized to drive more revenue to Google properties. And so, it’s that, it’s the exclusive access to huge pools of inventory and the data asset that’s come from all of the logged in users across Google and associated metadata. And then, you know the other things that are happening are pricing incentives for using more of the overall Google stack. So, you know, there are frequently deals where if a buyer will agree to buy X amount of YouTube or AdWords, they get benefits across more of the ecosystem. So, consolidation plays leaning on the dominant position in publisher ad serving, leaning on the dominant position in Search, leaning on dominant position in YouTube that say advertiser you should use our DSP too. That’s why we struggle to compete with DV360.”).

⁵⁹⁶ See, e.g., GOOG-DOJ-11728951, -975 (11/15/2019) (“Of new advertisers spending on GDN, about 1/3 of revenue in the first month comes from existing Search advertisers”); Deposition of John Dederick (The Trade Desk), Jul. 28, 2023, 277:8–279:14, (“Q. What is the “forcing agencies to commit part” mean? . . . A. . . . how is Google forcing agencies to commit to the entire tech stack, is the same reason that Google would operate an inferior DSP product, but be significantly more successful than The Trade Desk in 2015 and remains larger today. And it’s because of offering benefits to buyers from all of their access points into advertising. . . we talked about dominance in the advertising ad serving and in the DSP, not to mention exclusive access to YouTube and to Google Search in preferential access for AdWords. And so, all of those benefits mean that Google could structure a commercial agreement with an agency or an advertiser that says, only if you buy through my DSP will you get preferential rates on my inventory. . . if you commit to buying this much YouTube inventory via DV360, your DV360 rate and your ad serving rates are lower and your inventive fund is as such.”).

⁵⁹⁷ GOOG-DOJ-AT-01592535, at -542 (2018) (“Welcome to the Sell-Side World!”) (“Google Search ads started, and were so successful that we started putting them elsewhere i.e. on 3rd party websites, and called this ‘AdSense’ (2003).”); GOOG-DOJ-AT-00221276, at -311 (03/19/2019) (In 2003, a presentation on Google Display Network noted in,

been the only ad exchange with unrestricted access to Google Ads demand for display ads, which accounted for 38% of open-web display ad impressions transacted through exchanges in 2022.⁵⁹⁸ Having exclusive access to unrestricted Google Ads’ demand is one of the key sources of Google’s market power.⁵⁹⁹ (I discuss the importance of Google Ads’ demand further below in Section V.D and in VII.B.)

- (424) Third, DFP’s publisher customers are “sticky” because it is very disruptive for them to change ad servers. The stickiness of publisher ad servers was recognized at the time of Google’s DoubleClick acquisition.⁶⁰⁰ Through the DoubleClick acquisition, Google obtained a publisher ad server that already had a significant share of publisher customers, and these sticky single-homing publishers helped Google gain and continue to maintain market power in the publisher ad server market and elsewhere in the ad tech stack. (I discuss the importance of DFP for Google’s market power in Section VII.A.)
- (425) Fourth, Google offers unique access to the large number of AdSense customers.⁶⁰¹ Open-web publishers that use AdSense have few comparable alternatives to Google for the kind of all-in-one solution it offers.⁶⁰²

“Google AdSense Publisher network launched to tap into Google search demand”); GOOG-DOJ-11728951, at -975 (11/15/2019) (“Of new advertisers spending on GDN, about 1/3 of revenue in the first month comes from existing Search advertisers”).

⁵⁹⁸ Google Ads data (DOJ RFP 54) and exchange panel (see Appendix H). Shares reflect Google Ads impressions compared to all indirect open-web display impressions transacted through exchanges. *See* Figure 117 in Appendix F.

⁵⁹⁹ *See, e.g.*, GOOG-DOJ-AT-02118579, at -580 (07/11/2018) (A Google presentation titled “Sell-Side Pricing Strategy Review,” notes “The value Google delivers as a sell-side product, and thus our ability to charge publishers, is therefore heavily determined by how differentiated the incoming demand is, compared to the demand available through other sell-side products (networks or platforms). GDN demand via our sell-side products has the highest value to publishers, because they treat networks like GDN as new revenue that they could not get on their own.”).

⁶⁰⁰ *See* Sections V.B.1, II.E.2, and Appendix L.1.

⁶⁰¹ AdSense publishers only have access to Google Ads advertisers and select Google-certified Ad Exchange buyers. <https://support.google.com/admanager/answer/4599464?hl=en>. According to a 2018 presentation, Google’s AdSense publisher network has “3M websites and apps”, with “204M visitors/month” and “317B impressions/month” and access to “92% of US internet users.” GOOG-DOJ-AT-00221276, at -278-79 (03/19/2019).

⁶⁰² GOOG-DOJ-AT-00198548, at -551–552 (10/12/2020) (In a chat between Nitish Korula and Chetna Bindra, Korula says “Nobody else is interested in competing for AdSense publishers” and “Competing SSPs very explicitly don[’]t work with small publishers. So there[’]s no magical competitor out there who[’]s going to come in and invest in the tail of the web”). *See also* Deposition of Nitish Korula (Google), October 28, 2021, at 126:7–127:2, discussing uncertainties on products that compete with AdSense. *See also* GOOG-DOJ-04004392, at -399 (09/10/2018) (“AdSense was first to market and a strong leader in the simple website market on the strength of contextual targeting technology and strong demand from AdWords.”). *See* Section II.C.3 for a discussion of AdSense as an open-web display solution for small publishers.

uses significant amounts of historical data from within the ad tech stack to forecast future traffic volumes and to dynamically set reserve prices (i.e., price floors) across exchanges within DFP.⁶²²

V.B.2. Indirect evidence of Google’s market power in the publisher ad server market

- (436) Google’s high market shares, as well as evidence of significant barriers to entry, provide indirect evidence of Google’s substantial and sustained market power in the publisher ad server market.

V.B.2.a. Market shares

- (437) In this section I show, both using documents and data, that Google has maintained a very high market share in the publisher ad server market for an extended period of time.⁶²³
- (438) First, multiple Google documents since 2018 estimate DFP’s market share across various measures at roughly 85–90%, and identify few competitors in the publisher ad server market.⁶²⁴ Figure 41 below, sourced from a November 2020 presentation on Google’s Display Business, notes that Google Ad Manager (GAM), made up of DFP and AdX, is “critical to many of the world’s largest publishers,” and that “85% of ‘display web’ addressable inventory flow[s]” worldwide through GAM.⁶²⁵

⁶²² See Section III.D.3 for further details.

⁶²³ For some of the Google documents that report DFP market shares in this Section, it is not clear whether the calculation reported includes direct, indirect, or both sets of transactions that DFP serves; or if there is a geographic restriction. Nonetheless, the documents that I present all indicate DFP possesses high shares for a given set of transactions. Later, when I present estimates of DFP’s market share using data produced on this matter, I will present market shares based on both direct and indirect transactions, and for worldwide and US user-based impressions.

⁶²⁴ See, e.g., GOOG-DOJ-03070314, at -314 (05/10/2018) (Google “Audience story for Telco” deck states, “For the past couple of decades, DFP has been the ad server of choice for pretty much all publishers for display. 90% market share.”); GOOG-DOJ-03227244, at -252, -272 (06/24/2019) (Google Sell-side Business Forecast Meeting deck estimates Google’s global non-weighted web platform penetration, calculated as “breadth of top 2/3 of the addressable market,” to be 85%, and Google’s weighted average penetration to be ~91%. The slide deck defines “Web DFP Penetration” as “# domains with DFP tag or adsense hardcoded or Yavin impelmentation / # domains addr. running ads (nonweighted Breadth)”).

⁶²⁵ GOOG-DOJ-AT-00855803, at -807 (11/2020) (Google Display Business Overview deck).

Figure 41. November 2020 Google presentation showing the global scale and reach of Google's DFP and AdX products



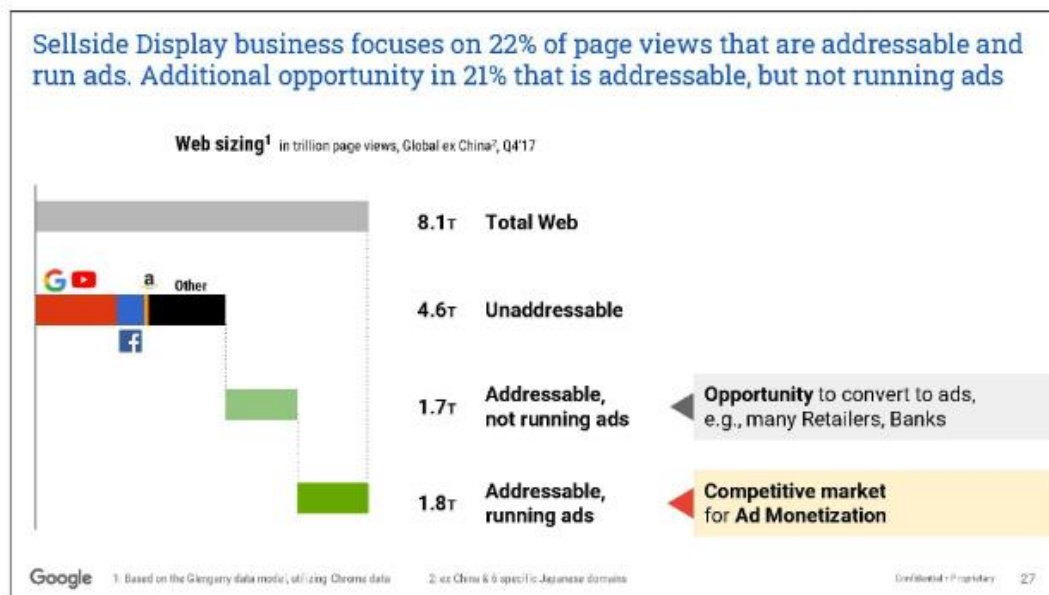
Source: GOOG-DOJ-AT-00855803, at -807 (11/2020).

- (439) Other Google documents point to a similarly large presence of DFP. An internal Google strategy document from 2018 states that GAM, including DFP, has a web penetration of the top 5,000 domains of "84% (breadth) and 66% (depth)."⁶²⁶ In a 2018 deck, Google designates its owned-and-operated properties and Facebook and Amazon as part of the "unaddressable" segment of the web for its sellside display business (see Figure 42 below), reflecting that this web inventory is not available to third-party ad tech products.⁶²⁷

⁶²⁶ GOOG-DOJ-04004392, at -396 (09/10/2018) (Google publisher strategy document). When discussing DFP web penetration, Google defines "breadth" as the percentage of addressable domains running ads that use DFP. "Depth" refers to the percentage of impressions from addressable domains that are served by DFP. GOOG-AT-MDL-001263326, at -327 and -341 (08/2018). Google presentations defined "addressable" web inventory as sites that "are addressable by Google Display Sales teams (excludes terminated or blacklisted sites)" and distinguish between "addressable, not running ads" and "addressable, running ads." GOOG-AT-MDL-007348297, at -344 (03/24/2021); GOOG-AT-MDL-001263326, at -327 and -341 (08/2018); GOOG-DOJ-04442323, at -350 (03/24/2021). Addressable inventory includes web display inventory on open-web publishers that can be sold using third-party ad tech products.

⁶²⁷ GOOG-DOJ-04442323, at -350 (02/08/20108) (Google Sellside Monetization and Search Distribution QBR deck notes that "'Other' unaddressable incl. Blacklisted sites (e.g. adult, gambling), other Competitors... Adult, Goog, YT, FB, Amzn, are not addressable.'). See previous footnote for definition of "addressable" inventory.

Figure 42. Google presentation showing unaddressable and addressable web inventory



Source: GOOG-DOJ-04442323, at -350 (02/08/2018) (Google Sellside Monetization deck).

- (440) Among the “addressable” segment of the web, containing open-web publishers that could in theory be served by DFP or competing third-party ad servers, the presentation notes that Google focuses on those that are running display ads as the “Competitive market for Ad Monetization.”⁶²⁸ Figure 43 below, a slide from this same deck, notes that Google “see[s] 84% of addressable” global (excluding China) web display ad impressions through DFP/AFC/AdX, with 62.5% served through DFP.⁶²⁹

⁶²⁸ GOOG-DOJ-04442323, at -350 (02/08/2018) (Google Sellside Monetization and Search Distribution QBR deck).

⁶²⁹ The slide focuses on 1.8T page views (converted into 7.2T impressions) on publishers Google designated as “addressable, running ads,” labelled as the “[c]ompetitive market for Ad Monetization.” GOOG-DOJ-04442323, at -350–351 (02/08/2018).

2.5% for display inventory; other open-source header bidding solutions, such as Prebid, are free (but require engineering investment to configure and optimize).⁶⁷¹

V.B.3.b. Google is able to significantly deviate from competitive behavior in the publisher ad server market

- (461) Evidence that Google has substantial and sustained market power in the publisher ad server market includes its ability to meaningfully deviate from competitive behavior in that market without losing significant sales. In a competitive market, a firm loses significant sales if it degrades the quality of its product, all else equal.
- (462) Google has been able to degrade the quality of DFP in ways that advantaged AdX, to the detriment of publishers, while maintaining a dominant share of the DFP market.⁶⁷² As OpenX CEO John Gentry noted in deposition, “they have such a dominant position that no publisher, at this point, has any realistic opportunity or would think necessarily about switching off of Google’s ad server. So with that being the case, they could make, really, whatever changes they want to make despite the fact that, you know, a publisher might not like it.”⁶⁷³
- (463) First, Google used DFP’s substantial market power to grant AdX exclusive first- and last-look advantages by originally excluding rival exchanges from Dynamic and Enhanced Dynamic Allocation until the introduction of Exchange Bidding (fully launched in 2018). Second, Google also removed variable pricing floors across exchanges within DFP, thereby impeding publishers’ abilities to work with rival exchanges. I discuss both of these actions further in Section VII.D. If DFP did not possess substantial market power and the publisher ad server market were competitive, Google likely would not have found it profitable to engage in such actions, as doing so would likely have lost Google and DFP a significant number of publisher customers.
- (464) Indeed, Google’s refusal to allow DFP customers to work on equal terms with rival exchanges as with AdX significantly contributed to the rise of header bidding, which became widely used in the 2014-2015 period.⁶⁷⁴ It is notable that during this period, when DFP did not offer publishers the ability to place AdX in competition with real-time bids from rival ad exchanges, publishers resorted to using header bidding (with its associated limitations and complications) rather than switch to another alternative publisher ad server.⁶⁷⁵ As noted in a 2016 Google strategy paper, “[t]he header ecosystem

⁶⁷¹ See Section II.

⁶⁷² Between January 2018 and September 2019, DFP’s maintained a 90% or greater share of impressions among publisher ad servers who produced data in each month. Following the release of UPR in September 2019, which many publishers viewed unfavorably (see Section VII.D.2), Google maintained its 90% or greater share. See Figure 45.

⁶⁷³ Deposition of John Gentry (OpenX), October 26, 2023, 31:18–32:7.

⁶⁷⁴ See discussion in Section II.E.3 and Appendix L.2.

⁶⁷⁵ See Sections II.E.3 and Appendix L.2 and L.3 for additional discussion of header bidding.

relies on our unwillingness to open our systems to the types of transactions, policies and innovations that buyers and sellers wish to transact.”⁶⁷⁶

- (465) Moreover, as I described above, when Google made Open Bidding broadly available in 2018, it charged 5-10% for use of this functionality, more than the cost of alternative header bidding tools (as discussed above). In a more competitive market, a rival publisher ad server alternative that enabled publishers to access multiple ad exchanges in real-time would likely have restricted Google’s ability to profitably levy such a fee.

V.C. Google possesses substantial and sustained market power in the ad exchange market

- (466) Google’s ad exchange, AdX, is the largest ad exchange for open-web display transactions, and possesses substantial market power. In this section,
- I first describe how AdX’s market power derives in large part from its advantaged treatment by Google Ads and DFP (Section V.C.1).
 - I then provide measures of AdX’s market shares and discuss barriers to entry and expansion in the ad exchange market (Section V.C.2). AdX is by far the largest exchange in the ad exchange market across a variety of measures. Among worldwide indirect open-web display transactions, I calculate that AdX has maintained a share of over 50-60% of impressions and over 40% of fees since 2018. Barriers to entry and expansion include significant fixed costs of building, maintaining, and starting an ad exchange; and overcoming network effect and data disadvantages relative to incumbents.
 - Last, I provide direct evidence of AdX’s market power (Section V.C.3). AdX has maintained a supracompetitive take rate of 20% since 2012 while maintaining high market shares. Google’s own analyses also indicate that Google could profitably raise AdX’s take rate above competitive levels. Moreover, Google’s conduct, including its ability to dynamically adjust reserve prices (starting in 2015) and use AdX to favor its own products in the ad tech stack even while degrading the quality of AdX by not submitting real-time bids into rival publisher ad servers, also demonstrate AdX’s substantial market power. Such conduct would not be sustainable in a competitive market, as customers would substitute away to comparable alternatives to an extent to make this conduct unprofitable.
- (467) Substantial barriers to entry and expansion in the ad exchange market have protected Google’s dominant position, and allowed it to maintain a high take rate and take actions that degrade AdX’s

⁶⁷⁶ GOOG-TEX-00097138, at -138 (09/26/2016) (“Integrating All Demand DRX Strat Paper”).

- (475) Even though some of AdX’s advantages within DFP have been reduced over time (for example, with the introduction of Open Bidding), due to the durability of network effects, the impact of Google’s actions on AdX’s market power likely persists.⁶⁸⁶

V.C.2. Indirect evidence of Google’s market power in the ad exchange market

- (476) Google’s high market shares across a variety of measures, as well as evidence of significant barriers to entry, provide indirect evidence of Google’s substantial and sustained market power in the ad exchange market.

V.C.2.a. Market shares

- (477) Below, I provide evidence that Google’s exchange product, AdX, has a high share in the ad exchange market across a variety of measures and is the largest player in this market, and has been for a number of years. This is consistent with third-party testimony describing AdX as “dominant” among ad exchanges.⁶⁸⁷
- (478) Google documents indicate that AdX transacts a large share of open-web display transactions. For example, according to a December 2019 Google presentation (see Figure 46 below), between October 2018 and November 2019, AdX and AdSense accounted for over 50% of total spend on remnant served impressions for a set of Google’s largest publisher customers, with the combined share increasing from 51% in the start of the period to 58% by November 2019.⁶⁸⁸ A large amount of

⁶⁸⁶ See Section III.D.1 regarding the persistence of network effects, and Sections VII.D and VII.F.1 regarding AdX’s advantages within DFP.

⁶⁸⁷ See, e.g., Deposition of Adam Soroca (Magnite), August 31, 2023, 20:7–16 (“Q. [H]ow would you characterize Google AdX’s position in the display ad exchange business? ... A. The dominant player in the market. Q. And why do you view Google’s AdX as the dominant display ad exchange? ... A. As we talk with our publishers and our advertisers they signal that that is the case.”).

Deposition testimony indicates that rival exchanges have significantly lower share. See, e.g., Deposition of Andrew Casale (Index Exchange), September 26, 2023, 145:6–14 and 146:4–11 (“Q. And what is Index’s approximate market share in programmatic open web display? A. There is no formality around that, so I would be guessing. But low single digits. But again, we have no way to know....Q. And do you have any notion of what Index’s market share is in open web display in the United States as opposed to globally? A. It would likely be a few points higher. But again, low single digits.”);

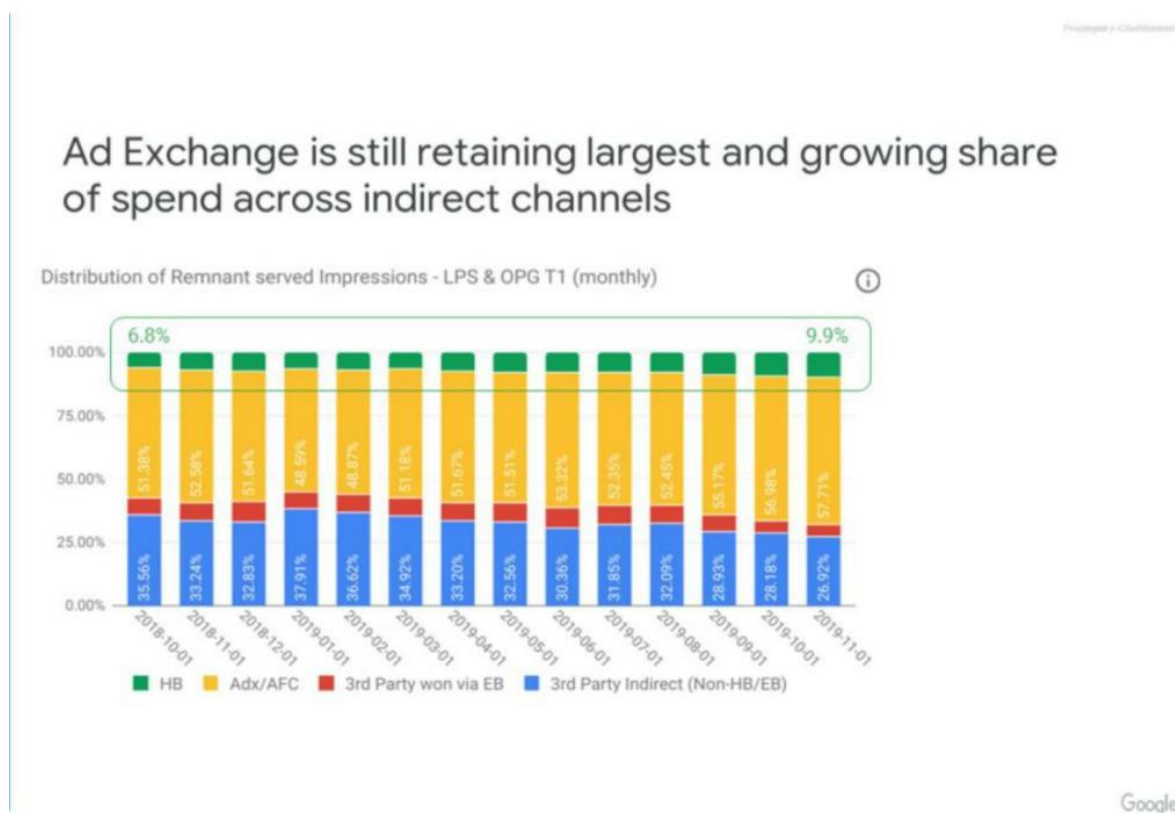
Deposition of Andrew Casale (Index Exchange), September 26, 2023, 147:5–147:15 (“Q. And how does the market share of folks like Magnite, PubMatic, and Index compare to the market share of a company like AdX? A. I think combined we’re still quite a bit smaller. Q. Even combining all three together against AdX by itself? A. Yes.”);

Deposition of Adam Soroca (Magnite), August 31, 2023, 21:15–22:11 (“Q. For display advertising, among the various different exchanges, which exchange does Magnite compete with most closely? A. We view our direct competitors as companies including PubMatic; Index Exchange; OpenX; now inside of Microsoft, Xandr. Q: And why didn’t you say AdX in that list of companies? A. Because they’re in a different category in terms of their size and our ability to compete and take share. Q. And why do you say they’re in their own category? A. They have such a significant share differential between us and our peers that there seems to be a ceiling on which we can gain ground. And so we typically just try to take share primarily from the list that I gave you.”).

⁶⁸⁸ GOOG-DOJ-11794721, at -739 (12/2019) (Showing “Distribution of Remnant served Impressions – LPS & OPG T1,” noting “Ad Exchange is still retaining largest and growing share of spend across indirect channels”). Another document indicates that transactions served by AdSense through backfill make up a small percentage of total DFP impressions. GOOG-TEX-00099020, at -022 (04/04/2017) (Google sell-side platform metrics from 2017 show that

display web inventory is also accessible through AdX: an internal Google presentation from 2018 notes that roughly 65% of “addressable impressions” worldwide are accessible through a combination of both AdX and Google’s AdSense products.⁶⁸⁹

Figure 46. AdX/AdSense share of indirect remnant served impressions



Source: GOOG-DOJ-11794721, at -739 (12/2019).

Notes: According to Google’s Dec 12, 2022 response to European Commission’s RFI 10 GOOG-AT-MDL-006217592, at -601, “LPS and OPG are both parts of Google’s sales organisation, Global Business Operations: (a) “LPS” stands for Large Partner Sales. LPS covers Google’s 100-200 largest sell-side partners. (b) “OPG” stands for Online Partnerships Group. OPG covers the remaining sell-side partners.”

- (479) AdX also likely had a significant market share in earlier periods. For example, a 2013 Google presentation referenced above reported AdX’s share of indirect impressions to be 27% with an 87% year-over-year growth (see Figure 44 in Section V.B.2.a), and described it as a “cash cow” of its display business.⁶⁹⁰

while nearly half of DFP queries were backfill-enabled, just 5% of those impressions were filled by AdSense, while 30% were filled by AdX.).

⁶⁸⁹ Worldwide excludes China and six specific Japanese domains. See GOOG-DOJ-04442323, at -351 (09/11/2018).

⁶⁹⁰ GOOG-DOJ-04445011, at -014 and -015 (05/2013).

- (480) Google’s high share in the ad exchange market is also corroborated by data produced in this case. As I show below, market share measures are consistent with AdX possessing substantial and sustained market power in the exchange market.
- (481) I present market shares based on impressions, or transactions served, by an ad exchange. As I discussed in Section III.D, via economies of scale and data, scale as measured by the volume of transactions handled by an ad tech product is important for an exchange’s competitiveness.⁶⁹¹ For this reason, impression shares directly inform relative scale advantages enjoyed by different products, and high impression shares are consistent with the possession of substantial market power. I also present net revenue, or “fee,” shares.⁶⁹² Although net revenue shares may reflect additional differences in ad tech products’ ability to earn fees and returns on investment, they are less directly informative for competitive differences arising from scale effects.
- (482) **Impressions.** When examining relative impression shares among ad exchanges that produced data in this matter, I find that AdX’s share of worldwide open-web display impressions ranges from roughly 63% to 71% between 2018 (the first year when the majority of exchanges that I have data from began reporting data) and 2022.⁶⁹³
- (483) However, because I do not have access to data from all participants in the ad exchange market, the above share calculation does not contain transactions from those other ad exchanges and hence overstates AdX’s share among all ad exchanges. To obtain a rough estimate of the number of transactions served through ad exchanges for which I do not have data, I perform the following calculation.⁶⁹⁴ First, I obtain the total number of worldwide indirect open-web display impressions that are purchased through ad exchanges from all bidding tools (DSPs and advertisers ad networks) that produced data sufficient to identify transactions by exchange. I compute that, in the years 2018 – 2022, the exchanges for which I have data represent approximately 58%–84% of worldwide open-web display transactions for this set of bidding tools, excluding DV360 and Google Ads (which meaningfully restrict bidding on non-Google ad exchanges). This figure is greater than 70% starting in 2019. Hence, although the ad exchanges that produced data comprise a substantial share of indirect

⁶⁹¹ See, e.g., Deposition of Andrew Casale (Index Exchange), September 26, 2023, 238:7–238:22 (“Q. What do you consider to be the most relevant metric or metrics for measuring scale in programmatic open web display?... A. I would say the total volume of auctions that you run, that's your ability to absorb the entirety of the scale of publishers, and then the total volume of auctions you clear which is really the most powerful signal that you give to any model, whether it be for price discovery, the win rate curves that I had mentioned or any form of curation.”); Deposition of Jessica Mok (Google), November 10, 2023, 53:2–16 (“Q. And what about the products within DVAA? A. The allocation of costs -- machine costs to product P&Ls within DVAA, we -- the methodology has evolved over time. Currently, we use -- currently, I think we use impressions. Q. And at the product level, so say for AdSense, are machine costs allocated according to the number of impressions? A. I believe so. Q. And what about for AdX? A. Same. [...] Q. What about Google Ads? A. Share of impressions, yes.”).

⁶⁹² In Appendix D.1.c I also calculate spending (gross revenue) shares and show that they are similar to net revenue shares.

⁶⁹³ See Figure 88 in Appendix D.1.

⁶⁹⁴ I describe this calculation in more detail in Appendix H.

open-web display transactions, there is still likely a meaningful share represented by other ad exchanges.

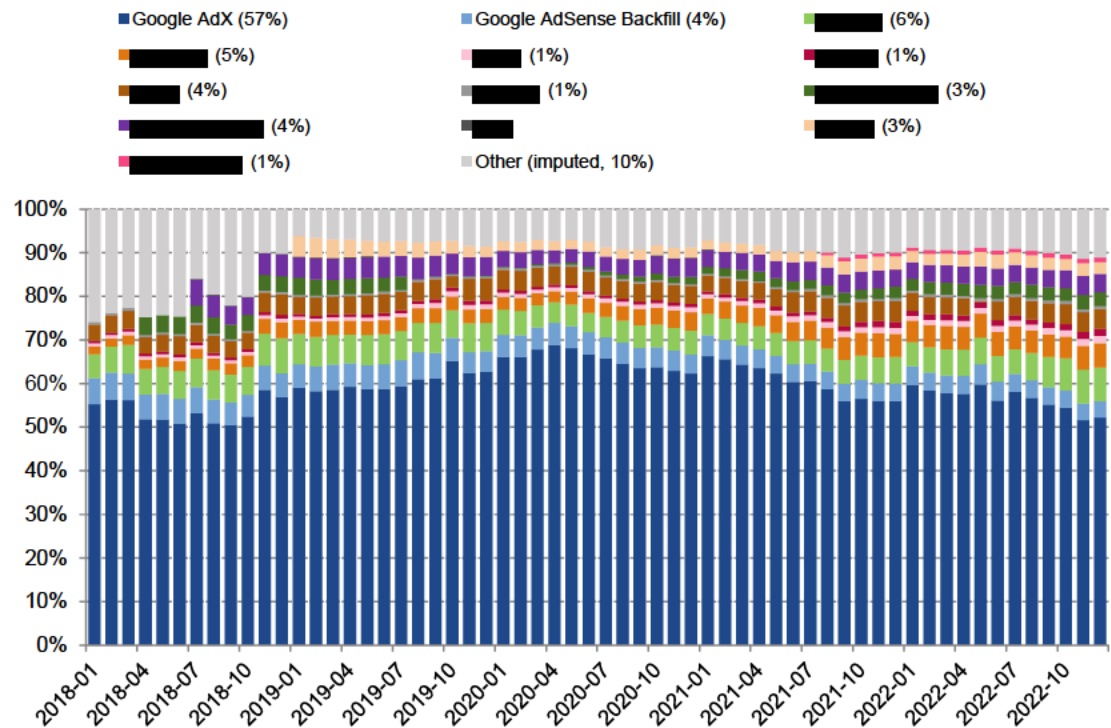
- (484) Following the approach outlined above, I am able estimate the total number of indirect open-web display impressions in each month transacted through ad exchanges that did not produce data using data produced by DSPs and advertiser ad networks.⁶⁹⁵ I use these estimates to supplement data produced by ad exchanges and am thus able to estimate the total number of indirect open-web display impressions transacted by ad exchanges in each month.
- (485) Using this approach to estimate total indirect open-web display impressions transacted by ad exchanges, I plot in Figure 47 Google AdX's share of worldwide indirect open-web display impressions among ad exchanges between 2018 and 2022. During this period, impressions transacted via Google's AdX represented approximately 54% to 65% of annual worldwide open-web display impressions sold through ad exchanges. As Figure 47 below shows, in 2022, AdX had roughly 9 times the number of worldwide open-web display RTB impressions of the next largest ad exchange that produced data.⁶⁹⁶

⁶⁹⁵ To estimate the total number of open-web display impressions transacted through ad exchanges that did not produce data on this matter, I use data produced by DSPs and advertiser ad networks that contains information on transactions by exchange. Among these bidding tools (excluding Google Ads and DV360), I calculate the ratio of impressions from exchanges that did not produce data relative to impressions from exchanges that produced data in each month. I apply that ratio to the number of impressions from ad exchanges that did produce data in each month (with adjustments to account for transactions through these ad exchanges from Google's bidding tools) to estimate the number of impressions from "other" exchanges. Appendix H describes how I perform this calculation in more detail.

⁶⁹⁶ The next-largest ad exchange that produced data was [REDACTED]. In 2022, AdX transacted roughly 6T indirect open-web display impressions worldwide (DOJ RFP 53); [REDACTED] transacted 688B indirect open-web display impressions ([REDACTED]).

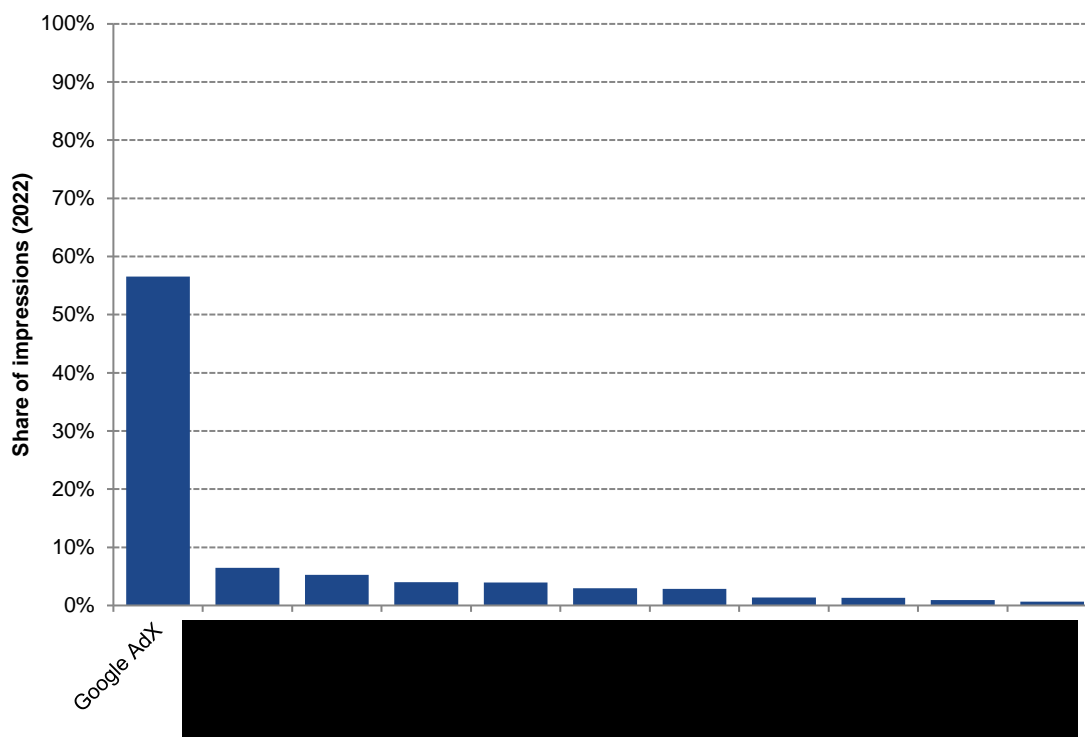
Expert Report of Robin S. Lee, PhD

Figure 47. AdX maintains a substantial share of worldwide indirect open-web display impressions transacted through ad exchanges (2018–2022)



Source: Google AdX data (DOJ RFP 53); Exchange panel (See Appendix H.1.c).
 Notes: Denominator includes impressions from Google and ad exchanges that produced data in this matter, and impressions estimated from exchanges that did not produce data on this matter ("Other (imputed)"). The set of exchanges within "Other (imputed)" varies during the time period shown due to incomplete data from certain third-party exchanges. Appendix H provides a description of how I perform this estimation. The legend contains the share of indirect open-web display impressions in 2022 in parenthesis for those exchanges that produced data on indirect open-web display impressions in 2022.

Figure 48. AdX and third-party ad exchanges' shares of worldwide indirect open-web display impressions among ad exchange (2022)



Source: Google AdX data (DOJ RFP 53); Exchange panel (See Appendix H.1.c).

Notes: 2022 worldwide indirect open-web display impression market shares for ad exchanges shown in Figure 47 (see table notes). In 2022, exchanges that did not produce data are estimated to represent 10% of worldwide indirect open-web display impressions. The largest of those exchanges, [REDACTED], represented less than 5% of impressions through bidding tools that produced by-exchange data.

- (486) Due to data limitations, I am unable to compute reliable ad exchange market shares based on transactions restricted to ad exchange customer locations—i.e., based on transactions involving US open-web publishers or US advertisers.⁶⁹⁷ However, I am able to present market shares based on *user locations*—i.e., based on the location of the visitor to a publisher's website. Such share calculations based on user locations can still be informative for at least two reasons.
- (487) First, publishers and advertisers in the US may particularly value ad tech products used to buy and sell display advertisements served to *users located in the US*. Consistent with this, a large fraction of open-web display transactions served by US publishers and purchased by US advertisers involve US users. For US publishers engaged in indirect open-web advertising on AdX and AdSense, a large proportion of their display advertising transactions involve US users (57% of impressions and 81% of spending for US AdX publishers, and 57% of impressions and 81% of spending for US AdSense

⁶⁹⁷ Information on publisher and advertiser geographic locations are missing from data provided by many third-party ad exchanges, advertiser ad networks, and DSPs that produced data in this matter.

Backfill publishers).⁶⁹⁸ For US advertisers engaged in indirect open-web advertising on DV360, a large proportion of their display advertising transactions involve impressions from US users (72% of impressions and 90% of spending).⁶⁹⁹

- (488) Since advertisers and open-web publishers located in the US are thus likely to particularly value ad tech products that are able to effectively serve display ads to US users, an ad tech product's high market share over US users can inform the extent to which that product is attractive to US customers (i.e., US open-web publishers and US advertisers).
- (489) Second, I am able to compare market shares based on user locations to those based on customer locations for a subset of exchanges whose data provide information on both publisher and user locations for indirect open-web transactions between 2020 – 2022. These exchanges include AdX, Magnite, Index Exchange, OpenX, and Equativ. I find that impression and net revenue shares among this subset of exchanges are very similar across transactions involving US publishers *or* US users.⁷⁰⁰ Hence, even though market shares computed using transactions involving US users are not the same as those computed using transactions involving US publishers, this analysis suggests that they may be close.
- (490) Having acknowledged these considerations, I calculate AdX's market share over transactions involving US users across a broader set of ad exchanges, and note that it is also high.⁷⁰¹ Limiting to indirect open-web display impressions for US users, AdX's share is between 45–55% from 2018 through 2022.⁷⁰² For 2022, this is 5 times as large as the next largest ad exchange competitor that produced data.⁷⁰³
- (491) Summarizing the above results, I calculate that AdX has maintained approximately an annual 55–65% share of worldwide indirect open-web display impressions among ad exchanges since 2018.

⁶⁹⁸ Google AdX data (DOJ RFP 53); Google AdSense Backfill data (DOJ RFP 7).

⁶⁹⁹ Google DV360 data (DOJ RFP 7).

⁷⁰⁰ For example, I find that there is less than a 1.5% share difference for AdX among this subset of exchanges, for both impressions and net revenues and across all years 2020 – 2022, between US market shares computed based on user versus publisher location. *See* Figure 86 and Figure 87 in Appendix C.4. () data does not contain net revenue information and is excluded from the calculation of net revenue shares).

⁷⁰¹ To estimate the size of US-user impressions transacted by ad exchanges that did not produce data, I perform the following exercise: I first compute the the average ratio of impressions for US users relative to impressions for all users among ad exchanges who produced data with sufficient user-geography information. I then apply that average ratio to the estimate of total worldwide impressions for the exchanges who did not produce data at all or who did not produce data with US-user breakdowns. *See* Appendix H.

⁷⁰² Figures depicting shares based on impressions from US users are contained in Appendix D.1.b.

⁷⁰³ In 2022, AdX transacted roughly 1.4T indirect open-web display impressions served to US users (Google AdX data (DOJ RFP 53)). () transacted just 275 billion indirect open-web display impressions served to US users during this period ().

Limited to impressions from US users, AdX has maintained approximately an annual 45–55% share since 2018.⁷⁰⁴

- (492) Note that Verizon (Yahoo) shut down its exchange product to open-web publisher inventory in 2023.⁷⁰⁵ Excluding Verizon’s impressions from the ad exchange market size would provide AdX a 58% share of worldwide impressions and a 48% share of impressions from US users in 2022.⁷⁰⁶
- (493) **Net Revenues (Fees).** Figure 49 below shows net revenues on worldwide indirect open-web transactions collected by ad exchanges for which I have data. AdX collects significantly more fees for transacting indirect open-web display impressions than other exchanges depicted. Since 2018, the first year that data is available for most exchanges, AdX has accounted for over 55% of total fees collected by this set of exchanges.

⁷⁰⁴ For robustness, I have analyzed AdX’s market shares across several alternative specifications and find that these results are consistent. *See* Figure 89 in Appendix D.1.

⁷⁰⁵ Sara Fischer, “Exclusive: Yahoo to lay off more than 20% of staff as it shrinks ad biz,” Axios, February 9, 2023, <https://www.axios.com/2023/02/09/yahoo-layoffs-2023-tech-media-companies>. *See also* YAH_GG_LIT_004590 (06/26/2023).

⁷⁰⁶ *See* Figure 88 and Figure 89 in Appendix D.1.a.

V.C.3.b. Google is able to significantly deviate from competitive behavior in the ad exchange market

- (511) Evidence that Google has substantial and sustained market power in the ad exchange market includes its ability to meaningfully deviate from competitive behavior in that market.
- (512) As noted above, in a competitive market, a firm loses significant sales if it degrades the quality of its product, all else equal. In the ad exchange market, Google has degraded the quality of AdX in a manner that favors its other ad tech products by restricting the access and use of real-time bids from AdX by third-party publisher ad servers.⁷⁴² This policy discouraged publishers from using rival publisher ad servers, but it also restricted access to the supply of inventory available for AdX to buy on non-DFP servers. In a competitive market, an ad exchange (all else equal) would not likely be able to profitably restrict access to the supply of inventory available to its advertiser customers, as doing so would risk losing a large amount of its transaction volume to ad exchange rivals that did not impose such restrictions.
- (513) Google limiting AdX's real-time bids into rival publisher ad servers is consistent with Google's ability to deviate from competitive behavior in the ad exchange market. I discuss this conduct further in Section VII.C.
- (514) Moreover, Google's ability to substantially price discriminate in the ad exchange market is also consistent with it possessing substantial market power. With AdX Dynamic Revenue Sharing (AdX DRS), launched in August 2015 and persisting until September 2019, Google changed the take rate that AdX levied at the impression (or query) level. Experiments run in 2014 indicated that AdX DRS increased auctions won, revenue, and profit.⁷⁴³ According to Google, assuming "an agreed upon aggregate revenue share of 20% with a GAM publisher," AdX was able to charge a take rate as high as 40% "on a per-query basis."⁷⁴⁴ The ability to essentially double the take rate on a given query from the average fee is consistent with the possession of substantial market power.
- (515) Similarly, Google's Reserve Price Optimization (RPO) program, launched in April 2015, also demonstrates AdX's substantial market power.⁷⁴⁵

⁷⁴² See Section VII.C on Google's exclusive provision of unrestricted access and use of real-time bids from AdX to DFP.

⁷⁴³ GOOG-DOJ-14712011, at -013 (12/04/2014) ("The number of winning auctions increase, and so do revenue and profit."). See also Section VII.D.1, where I discuss AdX DRS in more detail.

⁷⁴⁴ See GOOG-AT-MDL-006217592, at -593 (12/12/2022) (Google's response to the European Commission's RFI states, "On a per-query basis, and assuming an agreed upon aggregate revenue share of 20% with a GAM publisher: (a) In the initial version of Dynamic Revenue Share, the minimum revenue share applied was 0% and the maximum revenue share applied was 20%. (b) In the second version of Dynamic Revenue Share (launched in December 2016), the minimum revenue share applied was 0% and the maximum revenue share applied was 40%, but the objective was to keep the average revenue share at 20% over queries.").

⁷⁴⁵ GOOG-AT-MDL-009013263, at -263 (05/01/2015) ("In April 2015, AdX launched buyer based RPO. In this version we use bid predictions based on the combination of publisher, inventory unit and buyer to set dynamic reserves."). Later that year on October 5th, Google launched "Cookie based RPO" which "set different reserve for every query based on

- (516) In Section III.E, I described how a seller can increase its expected revenues in an auction by using a reserve price.⁷⁴⁶ As described by Google, RPO “has been a successful project for increasing publisher revenue in second price auctions” and worked by computing reserve prices “based on historical bids and applied in the AdX auction to increase the clearing price of matched queries.”⁷⁴⁷ As opposed to using information on bids from the current auction to adjust AdX’s margin (as in AdX DRS), RPO used historical bid information to dynamically set reserve prices for subsequent auctions.⁷⁴⁸ Notably, Google Ads was exempted from RPO on AdX.⁷⁴⁹
- (517) When launched, RPO meaningfully increased revenue from AdX buyers by increasing dynamically the reserve price they would face.⁷⁵⁰ A 2017 Google document noted a “key goal” of RPO “is to exploit the gap between the winning bid and the transaction price by inserting a (higher) reserve price between the two thereby inducing the winner to spend more.”⁷⁵¹ To increase publisher yields and payouts, RPO raised prices that advertisers using non-Google bidding tools paid for impressions transacted through AdX.⁷⁵² A Google executive noted in a December 2016 email that AdX would be

the buyer and cookie” See GOOG-AT-MDL-009644098. See also GOOG-AT-MDL-009013186, at -187 (05/26/2015). In early 2018, an “online” version of RPO was launched (GOOG-DOJ-15211461), in which Google uses “live” cookie data to update predictions (GOOG-AT-MDL-009013427, at -427). RPO was discontinued with the transition to first-price auctions (GOOG-AT-MDL-010514506, at -507, “1P RPO is more complicated and could not be done in time for 1P Auction, but we believe this optimization is crucial for 1P yield long-term.”), but relaunched as first-price RPO for a subset of web transactions in June 2022 and expanded to remaining GAM web traffic in January 2023 (GOOG-AT-MDL-009644610, GOOG-AT-MDL-013281679).

⁷⁴⁶ In a second-price auction, the reserve price affects the auction price when the reserve price is between the highest and second-highest bids. In a first-price auction, a reserve price tends to reduce bid-shading and increase submitted bids.

⁷⁴⁷ See GOOG-AT-MDL-009832160, (n.d.). See also GOOG-AT-MDL-009013192, at -194 (03/14/2016) (“Dynamic Price V1 (launched in April ’15)... Pick revenue-optimal reserve for given bid distribution... Bucketing by web_property, adslot_code, mobile_browser_class [,] buyer_newtork_id p.] Apply floors trained on yesterday’s data to today’s traffic.”).

⁷⁴⁸ GOOG-AT-MDL-B-002097533, at -533 (04/2015) (April 2015 email from Google employee Ali Amini, “I think with RPO we moved into a new world that as a buyer, your current bids can be used against you in the future. With DRS, as a buyer your current bid can be used against you in the current auction.”).

⁷⁴⁹ RPO initially exempted buyers at the query-level if they (i) set a minimum CPM value greater than 0, or (ii) submitted two or more open auction bids and had not removed self-second pricing. See GOOG-AT-MDL-009013505, at -506 (12/12/2017) (“we chose to exempt buyers that second price themselves from RPO”). In November 2017, Google changed this policy. See GOOG-AT-MDL-009013510, at -510 (11/14/2017) (“[i]n this launch we are changing the exemption policy to be based on a periodically computed whitelist of buyers. In order to get on the whitelist, a buyer needs to generate a certain amount of revenue lift via voluntary self-pricing. The amount of revenue lift required to get on a whitelist will be set to be a multiple of what RPO can provide on average for all buyers.”). See also GOOG-AT-MDL-B-002115457, at -458 (11/09/2017) (“the idea is to check if the minimum payments over a day actually result in significant revenue lift... If they do provide ‘significant’ increase in payments from a buyers (‘considerably’ higher than the average lift generated by RPO), then we exempt the buyer for the following day. As you would imagine, there’s no change for AdWords (since you’re not abusing the current mechanism to gain the system), but we do see an increase in AdX buyer revenue.”) and GOOG-AT-MDL-009013505, at -507 (12/12/2017).

⁷⁵⁰ GOOG-AT-MDL-009013263, at -263 (05/01/2015) (“This launch generated 4.5% incremental revenue from AdX (RTB+Hosted Bidding) buyers (About +0.85% on Adx+AdSense publishers overall).”) According to a 2016 document, “[o]n [AdX] Open Auction, buyers pay less than half of what they bid, on average. GOOG-AT-MDL-009013430, at -434 (05/09/2016). By February 2017, RPO was generating a lift of “over USD 300 million annually” and by 2019 the estimated incremental effect of RPO was \$500 million/year. See GOOG-AT-MDL-009013418, at -418 (02/2017) and GOOG-AT-MDL-010514506, at -507 (07/12/2020).

⁷⁵¹ GOOG-AT-MDL-009013418, at -418 (02/2017).

⁷⁵² According to a 2016 document, RPO “effectively reduces the gap between the first price and closing price increasing

- Describing Google Ads’ ability to target supracompetitive margins and vary its bidding behavior to increase profits and affect publishers’ behavior. Google’s own analyses indicates that it could profitably do so as far back as 2014.
- Discussing how Google has used its market power in the advertiser ad network market to favor its own products in the ad tech stack, thereby degrading the quality of Google Ads in the process. In a competitive market, this would lead to significant substitution to competing products. In this market, protected by significant barriers to entry, Google Ads was able to maintain its market share over time despite degradations to its quality.
- Presenting two analyses—one using 2023 data produced in the matter, and another described in a 2014 Google document—demonstrating that Google Ads has the ability to meaningfully affect publisher payouts through its participation in ad exchange auctions. This impact on payouts indicates that Google Ads provides significant value to publishers over alternative demand sources, enabling it to levy supracompetitive fees.

(520) For these reasons, I conclude that Google Ads has substantial market power in the advertiser ad network market, and has likely had such market power since at least 2015.

V.D.1. Sources of Google’s market power in the advertiser ad network market

(521) Google Ads’ dominant position in the advertiser ad network market derives in part from its access to unique advertising demand and publisher inventory, and its much larger scale than other competitors and potential competitors.

(522) **Unique advertising demand and publisher inventory.** Google Ads had a key advantage from its creation because of its exclusive access to valuable Google Search advertising inventory.⁷⁵⁶ Google later added the ability to access open-web display advertising through Google Ads.⁷⁵⁷ Given the costs of using multiple bidding tools and the tendency for smaller advertisers to use a single bidding tool for digital advertising needs,⁷⁵⁸ Google Ads started with a large source of advertising demand through search as it developed its web display advertising business. This was described in a 2017 presentation

⁷⁵⁶ In addition, a deal with AOL enabled AdWords advertisers to purchase search ads on AOL search listings and thereby granted AdWords and its customers access to AOL’s then-34 million users. Christine Frey, “Overture Loses AOL Contract to Google,” Los Angeles Times, May 2, 2002, <https://www.latimes.com/archives/la-xpm-2002-may-02-fi-overture2-story.html>. The deal propelled Google’s search advertising business and by early 2003, Google touted the “largest and fastest growing” online advertising base in the industry, with over 100,000 advertisers. Google, Google News, “Google Builds World’s Largest Advertising and Search Monetization Program,” Google, March 4, 2003, <https://googlepress.blogspot.com/2003/03/google-builds-worlds-largest.html>.

⁷⁵⁷ See GOOG-DOJ-AT-01592535, at -542 (09/27/2018) (A presentation titled, “Welcome to the Sell-Side World!” states, “Google Search ads started, and were so successful that we started putting them elsewhere i.e. on 3rd party websites, and called this ‘AdSense’ (2003)”).

⁷⁵⁸ See Section IV.E.1.

by Google as providing Google Ads with “[u]nique demand that adds auction pressure to drive greater CPMs, fill and overall yield”.⁷⁵⁹

- (523) Today, Google Ads customers gain access to additional Google O&O inventory including YouTube that cannot be accessed through non-Google bidding tools,⁷⁶⁰ as well as access to open-web publishers using AdSense. Large advertisers and those with more complex advertising needs often use both Google’s DSP product, DV360, and Google Ads.⁷⁶¹ Small advertisers and those with less complex advertising needs, who tend to single home on bidding tools and use advertiser ad networks rather than demand side platforms, have no realistic alternative to Google Ads to access unique Google inventory.⁷⁶²
- (524) **Scale and data.** Related to its access to unique demand and supply sources, Google Ads also benefits from its significant scale. For example, a 2018 Google presentation on Google’s Display Network, highlights the advantage that Google Ads is able to provide advertisers by having access to “3M+ website and app partners” and being able to target users across its entire network.⁷⁶³ Having by far the largest transaction volume of any competitor in the advertiser ad network market provides Google Ads with scale and data advantages in developing better targeting algorithms that lead to better ad campaign performance for its advertiser customers.⁷⁶⁴

V.D.2. Indirect evidence of Google’s market power in the advertiser ad network market

- (525) Google’s high market shares across a variety of measures, as well as evidence of significant barriers to entry, provide indirect evidence of Google’s substantial and sustained market power in the advertiser ad network market.

⁷⁵⁹ See GOOG-DOJ-04429792, at -804 (04/2017) (“Monetization Cheatsheet”).

⁷⁶⁰ Advertisers can access YouTube and Google O&O inventory like Search via Google Ads. Google, “Grow your business with Google Ads,” *Google Ads Help*, https://ads.google.com/intl/en_us/home/campaigns/video-ads/. See also Sections II.C.3 and V.A.1.

⁷⁶¹ See Figure 33 and Figure 38 in Section IV.E.1.a.

⁷⁶² See Figure 35 in Section IV.E.1.a. See also Deposition of Eisar Lipkovitz, March 31, 2021, 315:20–316:14 (“Q. I guess the thing that I’m trying to understand is, is it [GDN demand] differentiated because of the targeting and targeting technology? Is it differentiated because it’s using different data signals? Is it differentiated because it’s using -- it has small advertisers that are able to buy programmatically through it?... A. I mean, Tim, literally it’s all of the above, right. Really, the key point there is the advertiser is not in full control of each impression, because the advertiser chose to outsource that work to GDN, right. And if it’s a small advertiser, frankly, that’s the only thing they can do. Like they have no idea how to do anything better, right.”).

⁷⁶³ GOOG-DOJ-AT-00221276, at -312 (n.d.). See also GOOG-AT-MDL-004522085, at -092 (02/2017) (“GDN reaches over 95% of global internet users and is the world’s largest ad network.”).

⁷⁶⁴ See Section III.D.

VII. Google has historically engaged in, and continues to engage in, conduct within and across the relevant markets that excluded and harmed the competitiveness of rivals and potential entrants

- (570) Over the last 15 years, Google has pursued a campaign to obtain, strengthen, and protect substantial market power throughout the open-web display ad tech stack. Although some of its market power may have been obtained through improvements to its existing products, Google has nonetheless engaged in other actions that have preserved its market power by acquiring or excluding rivals, and by frustrating and impeding their efforts to compete for customers.
- (571) In particular, Google has engaged in efforts to leverage its market power in one relevant market to strengthen its position in other markets. By using its position in one market to benefit its products in another, Google reduces demand (i.e., advertiser spending) or supply (i.e., publisher inventory) for rivals in the targeted market, both reducing the competitiveness of these rivals and the likelihood of entry of new ones. Moreover, because of indirect network effects and the need for different ad tech products to interoperate, reducing rivals' competitiveness in the targeted market also reduces the attractiveness of non-Google alternatives in other ad tech product markets.
- (572) In this Section, I examine the competitive effects of five actions that Google has undertaken with its ad tech products. I provide the basis for my opinion that these actions have harmed the competitiveness of rivals and their ability to attract advertiser spending and publisher inventory within the publisher ad server, ad exchange, and advertiser ad network markets. (Later, in Section VIII, I discuss how these actions have preserved and enhanced Google's market power and harmed customers and consumers.)
- (573) Before I examine the competitive effects of Google's five actions, I first provide background context for Google's conduct in Section VII.A.
- I provide an overview of Google's strategy in the ad tech stack since its acquisition of DoubleClick in 2008. This acquisition, which provided Google with its publisher ad sever (DFP) and ad exchange (AdX) products, laid the groundwork for Google's practice of using market power in one relevant market to foreclose rivals and distort competition in favor of its own products in another market. I describe as well the importance that Google placed on controlling the publisher ad server, allowing it to then further protect and enhance its market power across the ad tech stack.
 - I also describe how Google viewed yield managers and header bidding tools—which helped publishers access rival non-Google ad exchanges—as “disintermediation” threats to DFP's substantial market power. This discussion, as well as Google's varied responses, shows that

Google's efforts to impede and harm the competitiveness of rival ad exchanges not only had effects on competition within the ad exchange market, but also impacted competition within the advertiser ad network and publisher ad server markets and protected DFP's substantial market power. Moreover, the limited impact of these threats to Google highlights the durability of Google's entrenched position and market power, maintained and enhanced by the conduct described in the remainder of the Section.

(574) Next, I evaluate five actions taken by Google. In Sections VII.B and VII.C, I describe how following the acquisition of DoubleClick, Google established a Google-only pipeline through the heart of the ad tech stack, denying non-Google rivals the same access to real-time demand that it provided its own products, by providing:

- (1) Unrestricted access to Google Ads' advertiser demand exclusively to AdX;
- (2) Access to and use of real-time bids from AdX exclusively to DFP.

(575) In these instances, Google's actions denied or otherwise degraded rivals' access to a valuable asset that it controlled, and conditioned access to this asset on the use of its other products.⁸¹⁵ The bidding relationship between Google Ads and AdX foreclosed publishers who used a rival exchange from Google Ads' advertiser demand; this had the effect of diverting publisher inventory away from rival exchanges and towards AdX. Similarly, foreclosing rival publisher ad servers from access to real-time bids from AdX (whose own market power was enhanced by its preferred access to Google Ads) steered publishers towards DFP instead.

(576) Hence, Google used the market power it had in the advertiser ad network market with Google Ads to enhance AdX's market power in the ad exchange market, which in turn Google used to further strengthen and preserve DFP's market power in the publisher ad server market. Given Google Ads' and AdX's market power, Google possessed both the ability and evident incentive to engage in these actions. Such actions harmed the competitiveness of rivals in the relevant markets, ultimately to the detriment of advertisers and publishers.

(577) In Section VII.D, I describe how Google used DFP's market power, strengthened and preserved by the above conduct, to further advantage AdX over rival exchanges. It did so in at least two ways.

- (3) DFP granted AdX exclusive access among ad exchanges to its Dynamic Allocation and Enhanced Dynamic Allocation features (until the introduction of Exchange Bidding), thereby providing AdX with advantageous access to inventory over rival exchanges. AdX was thus

⁸¹⁵ In Sections VII.B.3 and VII.C.3, I discuss Google's AWBID feature, which allowed Google Ads to bid on rival exchanges for a subset of display impressions (albeit at a significantly higher targeted margin than it targeted on AdX), and Google's AdX Direct tag, which provided limited access to AdX to rival publisher ad servers. In both cases, I show that these features have meaningful restrictions, and that usage of these features is relatively small as a fraction of overall Ads or AdX transaction volume.

VII.A. Google's ad tech strategy and importance of DFP

- (583) This Section provides background and context for the evaluation of Google's exclusionary conduct examined in this report.

VII.A.1. Google's ad tech strategy and the importance of the publisher ad server

- (584) Google began its campaign to acquire market power in open-web display advertising equipped with the advantage of having access to the many advertisers participating in purchases of its search advertising through Google Ads (then referred to as AdWords). By offering its Google Ads advertisers access to display advertising as well, Google could use this source of demand to attract open-web publishers and their display inventory.⁸¹⁶
- (585) To help realize this objective and build up its open-web display advertising presence, Google purchased DoubleClick and its publisher ad server DFP in 2008,⁸¹⁷ formally introducing DoubleClick Ad Exchange (AdX) in 2009,⁸¹⁸ and later acquiring the DSP Invite Media in 2010⁸¹⁹ and yield manager AdMeld in 2011.⁸²⁰ With these pieces in place, Google restricted access to Google Ads' advertiser demand outside of its own "sell-side" products (AdX, AdSense, and DFP), and established an exclusive relationship between AdX and DFP. Both of these actions persist in some form today, and are described further below in Sections VII.B and VII.C.
- (586) By restricting access to demand from its valuable Google Ads product, Google was able to first attract and then lock in publishers to using its sell-side products, thereby providing it with the valuable display inventory with which to then attract additional advertising spend. Moreover, for reasons described in Section V.B, DFP's market power, once established, was protected due to significant

⁸¹⁶ See GOOG-DOJ-AT-01592535, at -542 (2018) ("Welcome to the Sell-Side World!"... "Google Search ads started, and were so successful that we started putting them elsewhere i.e. on 3rd party websites, and called this "AdSense" (2003)"); GOOG-DOJ-AT-00221276, at -311 (2018 presentation on Google Display Network, noting in 2003, "Google AdSense Publisher network launched to tap into Google search demand"); GOOG-DOJ-11728951, -975 (11/15/2019) (Presentation on "GDA/ GDN Intro" stating, "[o]f new advertisers spending on GDN, about 1/3 of revenue in the first month comes from existing Search advertisers"). See also GOOG-AT-MDL-014507977, at -006 (01/2009).

⁸¹⁷ Eric Schmidt (then-Google Chairman and CEO), "We've officially acquired DoubleClick," *Google* (blog), Mar. 11, 2008, <https://googleblog.blogspot.com/2008/03/weve-officially-acquired-doubleclick.html>.

⁸¹⁸ Google News Announcement, "Google opens new DoubleClick Ad Exchange," News from Google, September 18, 2009, http://googlepress.blogspot.com/2009/09/google-opens-new-doubleclick-ad_18.html

⁸¹⁹ Neal Mohan (then Google Vice President of Product Management), "Investing in Exchange Bidding," *DoubleClick Advertising Blog*, Jun. 3, 2010, <https://doubleclick-advertisers.googleblog.com/2010/06/investing-in-exchange-bidding.html>.

⁸²⁰ Neal Mohan (then Google Vice President of Display Advertising), "Helping publishers get the most from display advertising with Admeld," *Google* (blog), Jun. 13, 2011, <https://googleblog.blogspot.com/2011/06/helping-publishers-get-most-from.html>.

switching costs publishers face in this market and publishers’ tendency to use only a single publisher ad server for display advertising.

VII.A.1.a. The importance of the publisher ad server

- (587) As early as the DoubleClick Acquisition (for which I provide further background in Appendix L.1, Google documents and emails indicate that control of the publisher ad server was an important strategic advantage. By controlling what Google documents have referred to as the ad serving “decision engine” (and the associated “tag” or snippet of code on publishers’ webpages that called the publisher ad server),⁸²¹ Google could lock in customers and enhance its market power across the ad tech stack.
- (588) For example, in a 2009 email, then-Vice President of Product Management at Google, future SVP of video and display ads, and future YouTube CEO Neal Mohan expressed concern that if a rival gained control of the publisher ad tag, Google might lose access to display inventory: “If we lose [publisher] platform share, we can build the best GCN [ad network] in the world but will still be at a severe risk of being disintermediated if Y [Yahoo APT], M [MSFT Pub Center] own the ad tag on the publisher page.”⁸²² The email continued, “our biggest competitors have realized that the most important thing in display is having access to the right inventory (they can build the best networks but if they dont [sic] have the tag on the page, they could get disintermediated – just like we could).”⁸²³ The email concluded, “Fundamentally the glue that seals DFP to GCN is AdX (that is why it is the second pillar of our three-pillared strategy).”⁸²⁴
- (589) Google documents have described this strategy to “own the tag” with DFP, which would then benefit its other products (AdX and Google Ads), as follows:
- A 2017 Google “Monetization Cheatsheet” states, “Historically, Google has deployed an ‘own the tag’ strategy based on DFP to be the decision engine to allocate the impressions. AdX was then the only SSP that could potentially compete on dynamic price for all the impressions (called Dynamic Allocation).”⁸²⁵ (I discuss this conduct further in Section VII.D.1.)
 - In a 2017 email, a Google executive noted that, “Owning the ad serving tag is the right strategy and AdX (and DBM & Adwords) benefits from the direct line of inventory provided by DFP via dynamic allocation. ... Our buyers enjoy a competitive advantage from dynamic allocation,” and

⁸²¹ GOOG-DOJ-04429792, at -794 (04/2017), GOOG-DOJ-AT-02199478, at -487–88, -513 (06/2019).

⁸²² GOOG-DOJ-02148008, at -008 (03/23/2009). Google Content Network (GCN) is the former name of Google Display Network (GDN) which contains Google Ads.

⁸²³ GOOG-DOJ-02148008, at -009 (03/23/2009).

⁸²⁴ GOOG-DOJ-02148008, at -009 (03/23/2009). The email described the “three-pillared strategy” as “platform, AdX, network,” corresponding to DFP, AdX, and GDN (Google Ads).

⁸²⁵ GOOG-DOJ-04429792, at -794 (04/2017).

that “the value of Google’s ad tech stack is less in each individual product, but in **the connections across all of them.**”⁸²⁶

- (590) By “owning the tag”, Google would control the primary decision engine of the ad tech stack, allowing it to earn monopoly profits from the transactions that flowed through the stack.⁸²⁷ As I noted in Section V, Google did so in various ways: for example, by pricing its publisher ad server, exchange, and network services above competitive levels, and by taking advantage of its control over the decision logic of display ad serving in order to direct more transactions through its own products elsewhere in the stack (for example, through AdX).⁸²⁸ In addition, Google would be able to use the targeting information that it would gain by having access to nearly all open display ad serving on the web to enhance the market power of its other ad tech products.⁸²⁹
- (591) Other Google documents described this strategy of using its market power in the publisher ad server market to strengthen its position in other parts of the ad tech stack:
- Notes for a 2013 Google presentation, when describing “INTERCONNECTEDNESS” among its ad tech products, stated that “without DFP, would lose privileged access to inventory ... the function in DFP that enables GDN and Exchange buyers access to inventory that they cannot sell directly, or that we can sell at a higher pricepoint, is a huge business.”⁸³⁰
 - In a 2016 internal email exchange, a Google employee describing AdX’s historical advantages over rival ad exchanges within DFP stated that the “‘internal’ objective of our Sell-Side platform is to maximize our access to inventory. We managed historically to have an advantage through EDA [Enhanced Dynamic Allocation] vs other sources of demand...so our demand could win even if we did not provide the best CPM on a specific impression.”⁸³¹ As I discuss further in Section VII.D.1, AdX was provided with a “first-look” advantage within DFP that allowed it to win an impression even if some other demand source was willing to pay more.

⁸²⁶ GOOG-DOJ-04830048, at -048 (09/05/2017) (emphasis in original).

⁸²⁷ See, e.g., FBDOJGOOG_00028978, at -983 (2018 Facebook presentation, “Owning the decision of who wins the publisher impressions i.e., the Ad server, is the most important part of the ad tech stack.”); Deposition of John Gentry (OpenX), October 26, 2023, 43:8–43:25 (“Q. How big of a threat, if at all, is Amazon to Google’s dominance of the display exchange business?...[A.] I don’t believe they are. Q. Why do you say that Amazon is not a threat to Google’s dominance of the display exchange business?...[A.] Because Amazon does not own the ad server and the ad server is the -- as I mentioned earlier, that is where you have all the data around how those display ads are going to transact.”).

⁸²⁸ GOOG-TEX-00138857, at -860 (02/21/2017). (2017 DRX All Hands – Competitive Session notes, “[l]et’s go back to our DFP own the tag strategy. That strategy has served us well for a long time because it means we control the decision logic”).

⁸²⁹ GOOG-DOJ-13503400, at 404–05 (02/07/2019) (“Being First Tag on Page confers numerous benefits: Since we coordinate all demand callouts, we learn how every buyer bids and clearing prices. Since we see all the demand, we can form a good understanding of the value it brings relative to the latency cost its callout incurs... We can’t be intermediated by any 3rd party unless the publisher takes our tag off the page.”).

⁸³⁰ GOOG-DOJ-04445011, at -014 (05/2013).

⁸³¹ GOOG-TEX-00104315, at -315 (09/15/2016).

- A 2018 Google sell-side strategy document noted that by controlling “the ad serving decision engine” (i.e., publisher ad server), Google would “Gain Access” and “See More”, which it could then use to “Win More” through its AdX exchange product.⁸³²

(592) A 2018 Google memo discussing the “guiding principles and approaches for our publisher strategy” described Google’s strategy as follows: “we can say that our goal is to be a platform that is as closed as possible, but given that it is not fully possible, we should open up as much as needed for us to not lose access to inventory on the terms we want.”⁸³³ The document described additional benefits from a closed system—i.e., one that ensures “our demand is competing on favorable terms with third party demand”⁸³⁴—as including “Best possible case for our demand (no competition),” “Better control on margins,” and “More data access.”⁸³⁵

VII.A.2. Threats to Google’s substantial market power in ad tech and DFP

- (593) In the years following the DoubleClick acquisition, Google documents show that Google identified and responded to threats to its “own the tag” strategy and its “Must Call” status.⁸³⁶
- (594) One of the threats that Google documents identified around 2010 was from “yield managers,” which were products that allowed publishers to access and select among bids from multiple demand sources. Some, but not all, yield managers allowed publishers access to real time bids which further threatened Google’s ability to “own the tag.”⁸³⁷ A 2010 Google slide deck noted, “Yield managers are disintermediating our access to inventory, inhibiting our overall display strategy,”⁸³⁸ and notes for an August 2010 meeting among Google ad tech executives stated that, “Yield Managers are a threat we need to take very seriously.”⁸³⁹ In Section VII.E, I describe this threat further, and discuss how Google responded by acquiring the yield manager AdMeld in 2011.

⁸³² GOOG-DOJ-04442323, at -327 (09/11/2018) (““Gain Access” (Be the ad serving decision engine)[.] “See More” (Optimize so AdX buyers compete fairly)[.] and “Win More” (Optimize to improve chances AdX buyers win)”).

⁸³³ GOOG-DOJ-04004392, at -399 (09/10/2018).

⁸³⁴ GOOG-DOJ-04004392, at -392–393 (09/10/2018) (The document defines “Open features” as “platform features where all demand is competing on equal terms[.]” and “Closed features” as “platform features where our demand is competing on favorable terms with third party demand.”).

⁸³⁵ GOOG-DOJ-04004392, at -399–400 (09/10/2018).

⁸³⁶ GOOG-TEX-00120775, at -810 (10/27/2016).

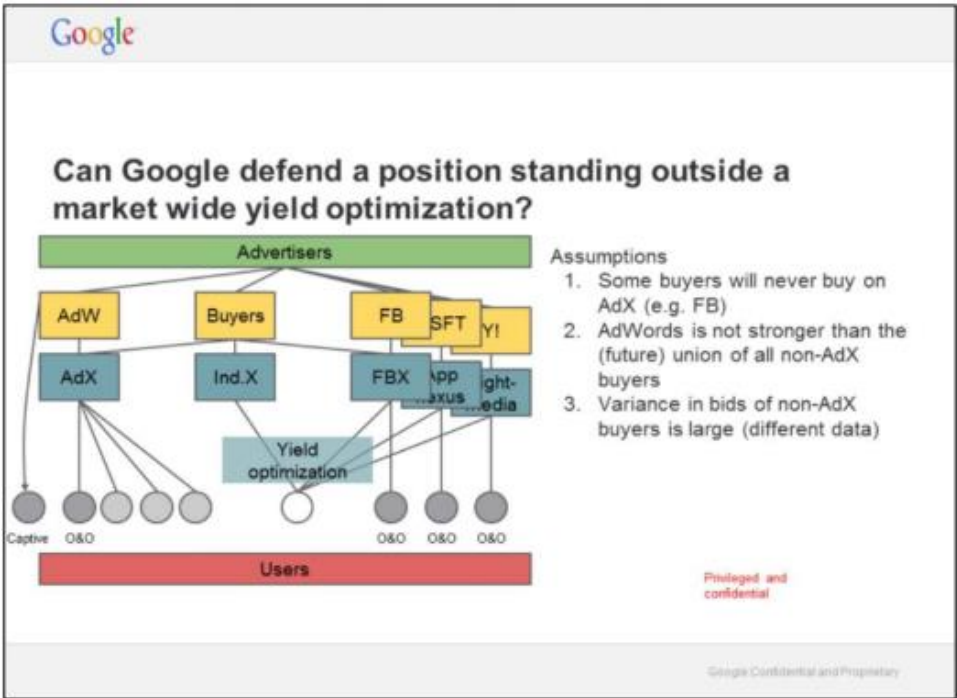
⁸³⁷ GOOG-TEX-00101777, at -780 (01/21/2011) (A Google slide deck titled “Non-Premium Display Competitive Deep Dive” states, “Yield Managers through a scrappy service and tech offering have side-stepped our platform strategy and are ‘owning the remnant tag’ for a growing number of premium publishers, putting at risk our current and future control over the inventory supply.”), -802–804 (Google summarizes its “Competitive Intel” for each of Rubicon, AdMeld, and PubMatic. For Rubicon, it states, “Still no support for RTB (in limited beta testing now).” For AdMeld, it lists “Real Time Bidding” under “Key Strengths.” For PubMatic, it lists “RTB Integration optional” under “Key Strengths.”).

⁸³⁸ GOOG-DOJ-13252093, at -094 (04/15/2011).

⁸³⁹ GOOG-DOJ-02139596, at -597 (08/26/2010) (emphasis in original).

(595) Disintermediation, however, continued to be a concern. A 2014 “GDN Inventory Strategy” presentation noted, “We have a problem with intermediation.”⁸⁴⁰ The presentation discussed “real time yield optimization” being used by publishers, and questioned whether Google could defend its position if other exchanges and networks participated through a “market-wide yield optimization” option used by publishers.⁸⁴¹ Figure 63 is a slide from this presentation depicting this scenario: advertisers (at the top of the diagram) connect through various bidding tools (in yellow) and through ad exchanges (in blue) to publishers (in circles at the bottom). Google’s products, Google Ads (AdW) and AdX, are not shown to be participating in the market-wide “yield optimization” option.

Figure 63. 2014 “GDN Inventory Strategy” presentation, market-wide yield optimization



Source: GOOG-DOJ-29478169, at -181 (“GDN Inventory Strategy (Appendix)”, 2014).

(596) The next slide in the presentation, shown in Figure 64, explored an alternative to “drive the rest of the market” to yield optimize instead through DFP.⁸⁴² To do so, the slide listed several assumptions, including “AdX stops backfilling” (providing demand) to rivals, and that DFP would open up Dynamic Allocation to all exchanges. In the diagram, Google Ads and AdX would still solely be accessible through DFP. This is consistent with Google employees recognizing the benefits of

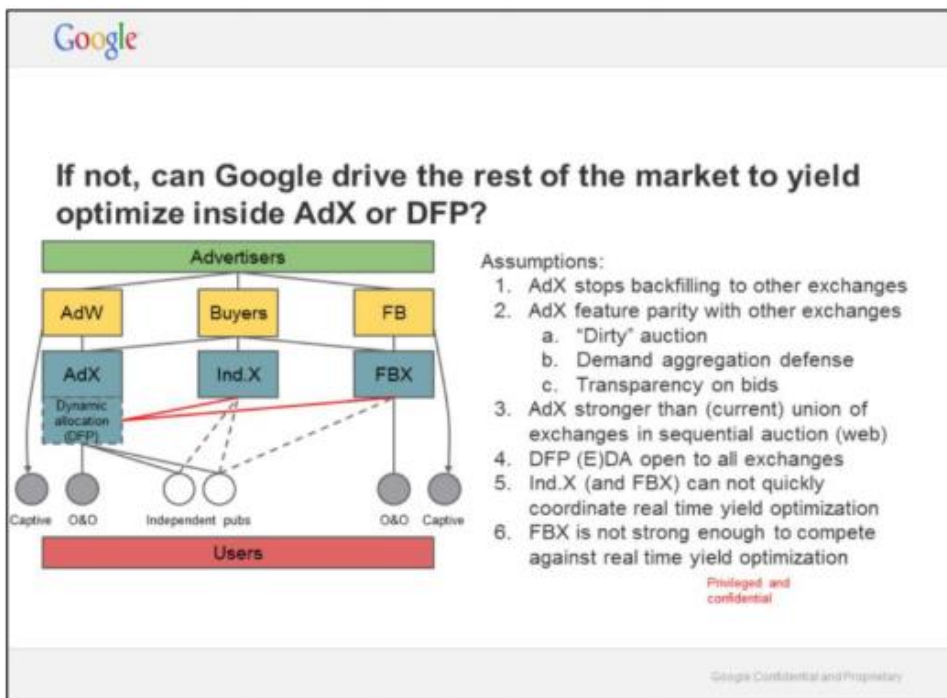
⁸⁴⁰ GOOG-DOJ-29478169, at -170 (07/10/2014).

⁸⁴¹ GOOG-DOJ-29478169, at -181 (07/10/2014).

⁸⁴² GOOG-DOJ-29478169, at -182 (07/10/2014).

denying rivals access to AdX (and its Ads demand) for increasing usage of Google’s products, and the feasibility of DFP allowing other exchanges to engage in real-time competition with AdX.

Figure 64. 2014 “GDN Inventory Strategy” presentation, AdX and DFP yield optimization

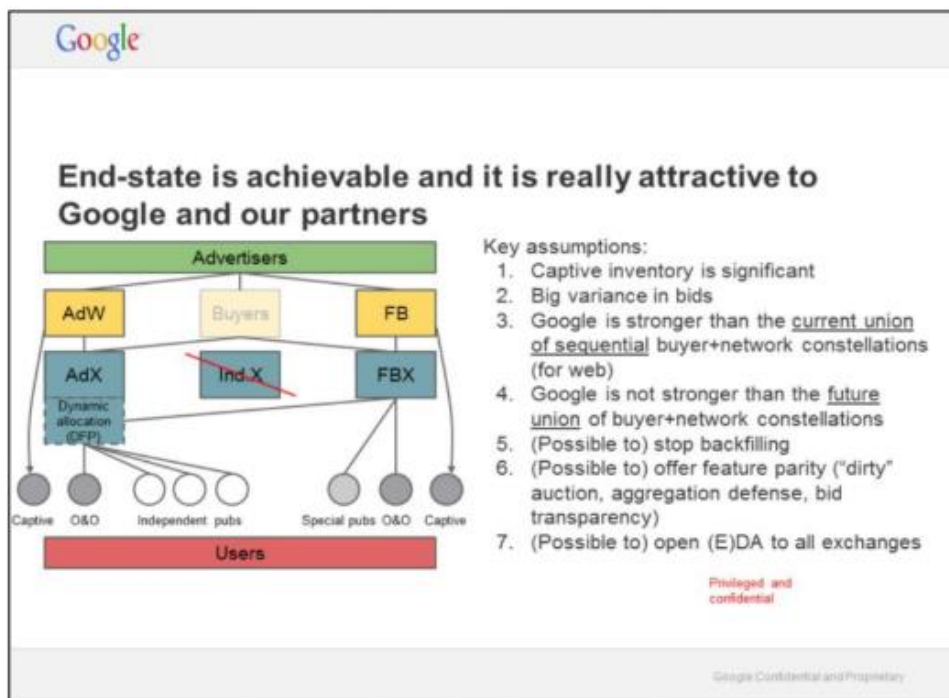


Source: GOOG-DOJ-29478169, at -182 (“GDN Inventory Strategy (Appendix)”, 2014).

(597) The presentation then depicted an “end-state” (shown in Figure 65), described as “achievable” and “really attractive to Google,” in which all transactions between advertiser and independent publishers (shown as the white circles at the bottom of the diagram) flowed through Google’s Ads, AdX, and DFP products.⁸⁴³ Notably, in this end state, independent rival exchanges are cross out in red (“Ind. X”).

⁸⁴³ GOOG-DOJ-29478169, at -182 (07/10/2014).

Figure 65. 2014 “GDN Inventory Strategy” presentation, AdX and DFP yield optimization end-state



Source: GOOG-DOJ-29478169, at -185 (“GDN Inventory Strategy (Appendix)”, 2014).

(598) In many ways, this discussion previewed Google’s responses to the threat acknowledged from header bidding some years later. A 2019 Google “Strategy Paper” described the threat posed by header bidding, and “if 3rd-party demand sources get a foothold on the publisher’s page with their [JavaScript tag]”:

A decade and a half ago, long before the advent of Header Bidding, publishers would typically place one “server of record” ad tag on their pages. That ad server was responsible for selecting which creative, from a catalog, would serve on the page. The pub ad server tag held the position of First Tag on Page...

Around this time, the RTB-enabled exchange business model came about. Pubs placed an exchange tag into their ad server, which allowed them to efficiently monetize remnant inventory without mediation waterfalls. Yahoo’s Right Media Exchange (RMX) was a leader in this space. Around 2008, AppNexus developed a “preemptive” tag, which sat in front of RMX and provided pubs with a simple, low-risk way to give AppNexus first look at queries: proto-Header Bidding. As AppNexus demonstrated superior monetization compared to RMX... they convince publishers to set a config flag that stopped sending queries to RMX altogether. This strategy was so successful that by 2012, Right Media Exchange was more-or-less

dead, and the business was shuttered in 2014...

Our current-day analog for the RMX preemptive tag is Header Bidding...The takeaway is that being preempted by another demand source puts our access to the publisher's inventory at risk.⁸⁴⁴

- (599) Statements from internal documents indicate that Google recognized rival demand sources (which includes ad exchanges and advertiser ad networks) working with header bidding tools could grow into or facilitate potential competitors to DFP, and ultimately challenge Google's control of open-web display advertising inventory. Hence, through actions that harmed competition in the ad exchange market, Google protected and enhanced its substantial market power in the publisher ad server market.
- (600) In Appendix L, I describe how:
- Publishers viewed header bidding as a way around Google's restrictive policies regarding the use of its ad tech products, and benefited from header bidding allowing them to pit multiple demand sources in real-time competition against one another.
 - Google perceived header bidding as an "existential threat" to its market power in the ad tech stack. I discuss how header bidding (in a manner similar to yield managers) could provide existing competitors or new entrants an ability to compete more effectively in the publisher ad server market by assisting publishers with accessing multiple real-time demand sources and exchanges.
 - Google responded to header bidding in several ways, including launching Exchange Bidding and adjusting its bidding strategies for DV360 that had the effect of diverting advertiser spending away from third party exchanges and towards AdX. (In Section VII.D.2, I discuss another response—the restriction against setting variable price floors—that harmed the competitiveness of rival exchanges.)
- (601) This discussion related to header bidding and Google's responses supports two important points:
- First, despite the threat posed by header bidding, Google was able to maintain its substantial market power in the relevant markets.⁸⁴⁵ This is in part due to Google's extant market power across the entire ad tech stack (preserved and enhanced by Google's conduct discussed later in this Section), which Google used in various ways to minimize the competitiveness of rival ad exchanges.

⁸⁴⁴ GOOG-DOJ-13503400, at -401–402 (02/07/2019).

⁸⁴⁵ GOOG-TEX-00124787, at -793 (07/09/2018) (A July 2018 Google presentation stated that, "Stopping HB may not be entirely feasible; Our focus is to tolerate it, by driving toward use of HB only for incremental demand (like AMZN)").

- Second, the potential threat that header bidding adoption posed to DFP likely incentivized Google to innovate and introduce Exchange Bidding (later renamed Open Bidding).⁸⁴⁶ I return to this point, and the role that competition plays in encouraging innovation, in Section VIII below.

(602) Having provided this context, I turn in the rest of this Section to discussing the conduct that is the focus of my report.

VII.B. Google provided unrestricted access to Google Ads exclusively to AdX, thereby foreclosing rival exchanges from access to Google Ads' advertiser demand

- (603) Following the DoubleClick acquisition, Google launched “AdX 2.0” (hereafter, AdX) on September 17, 2009.⁸⁴⁷ A 2009 Google document titled “AdExchange primer” explained that AdX would be “linked to both AdSense and AdWords, leveraging [Google’s Content Network]” and that AdX would differentiate from other exchanges via “access to AdWords advertisers.”⁸⁴⁸ (In this Section, as I have previously, I use Google Ads to refer to the advertiser ad network component of the product formerly known as AdWords.)
- (604) Since the launch of AdX, Google has restricted the demand provided by Google Ads into rival exchanges, and continues to provide unrestricted access to all of Google Ads' advertiser demand (“Google Ads demand”) for display advertising only to publishers using AdX and AdSense; Google documents have referred to this relationship as “exclusivity” between Google Ads and AdX.⁸⁴⁹ This exclusivity provides a competitive advantage to AdX and encourages publishers to use or prioritize AdX over rival exchanges.

⁸⁴⁶ GOOG-TEX-00117939, at -939 (01/06/2016) (At the same time, in 2016 Google described its goal for “allow[ing] non-AdX exchanges to compete with realtime pricing from within DFP” within Exchange Bidding is “to provide slightly better value for publishers than header bidding but not so much that it completely cannibalizes AdX.” GOOG-TEX-00117939, at -939. Google also charged a fee for participants in Exchange Bidding. See discussion in Section II.E.4 and Appendix L.3.a.

⁸⁴⁷ Neal Mohan, “The DoubleClick Ad Exchange: growing the display advertising pie for everyone,” Google Official Blog, September 17, 2009, <https://googleblog.blogspot.com/2009/09/doubleclick-ad-exchange-growing-display.html>; GOOG-DOJ-11899169, at -196–198 (10/10/2011).

⁸⁴⁸ GOOG-DOJ-12119445, at -445–447, (10/06/2009).

⁸⁴⁹ GOOG-DOJ-05247075, at -083, (09/14/2012) (“Google “chosen to limit GDN to buying only on AdX, an exclusivity that makes AdX more attractive to sellers.”); GOOG-DOJ-03525434, at -434 (10/18/2013) (“AdWords advertiser demand is currently limited to buying inventory that is available on GDN and inventory managed through AdX.”); GOOG-DOJ-07275375, at -517 (01/14/2016) (“the key differentiator of AdX: GDN exclusivity and dynamic exclusivity.”); GOOG-DOJ-AT-00045716, at -719 (04/26/2019) (“not all Google Ads demand is currently available on 3rd party exchanges.”).

meeting, Google executives noted that “unique Google Display Ad demand” allowed it to justify “why we can charge 20%” fees for open auction transactions won on AdX, even on transactions that did not use Google Ads’ buying tools.⁸⁶⁷ Similarly, Google’s Global Product Lead Chris LaSala wrote in a 2018 email:⁸⁶⁸

[W]e are NOT seeing pressure on the AdX 20%, but I am making a statement that it is because it provides nearly exclusive access to GDN demand. If GDN bought liberally through all third-party exchanges, I think the 20% would crater.

VII.B.3. Google’s AWBid program did not prevent rival ad exchanges from being foreclosed from Google Ads’ demand

- (620) By 2010 Google had started developing a project referred to as Adwords Bidder, or AWBid, “to enable AdWords buyers to access additional inventory outside of the traditional AdSense and [AdX] publishers.”⁸⁶⁹ In this Section, I show that this project, which did not fully launch until June 2015, was restricted to a subset of Google Ads’ impressions, targeted higher margins on rival ad exchanges than on AdX, and ultimately has had limited impact on the share of Google Ads’ spending on rival ad exchanges.
- (621) A 2011 Google document titled “AdWords cross-exchange bidding” expressed concern that Google Ads’ rivals were “winning business against GDN” due to their ability to purchase inventory more widely, and that “[o]ur assumption is that GDN needs to become a cross exchange buyer to stay relevant as a network.”⁸⁷⁰ However, the document also acknowledged that such a strategy came with risk:

Currently AdSense and AdX use AdWords demand as a unique sales proposition... Given the current market position of AdX versus other yield managers, if publishers can get the same AdWords RTB demand from any yield management/exchange

07799709, at -709 (08/07/2018) (a 2018 email in which Google executive Chris LaSala states, “[W]e historically have been subsidizing the platform (ad server discounts like the ones reflected in these deals) with the OA rev share at 20%.... My personal view is that we’ve been able to hold OA pricing because it provides access to AdWords demand (AWBid is still a small %).”).

⁸⁶⁷ GOOG-DOJ-15128751, at -751 (05/01/2019).

⁸⁶⁸ GOOG-DOJ-11781965, at -965 (08/06/2018).

⁸⁶⁹ GOOG-DOJ-05244847, at -849 (02/14/2011).

⁸⁷⁰ GOOG-DOJ-03872448, at -448 (04/17/2013) (“There is a shift happening across the industry – where competitive networks have access to all of the inventory we represent through AdX + AdSense plus access to other exchange inventory (like Yahoo and Microsoft) and publisher inventory (from yield managers such as PubMatic, Rubicon, and AdMeld). Competitors such as Criteo and Dapper are winning business against GDN as a result of this differentiation. Our assumption is that GDN needs to become a cross exchange buyer to stay relevant as a network.”).

partner, we expect many publishers would terminate their AdX relationship in favor of their preferred alternate vendor.⁸⁷¹

- (622) This tension that AWBid introduced—on the one hand, providing Google Ads’ advertisers with access to a greater supply of display inventory; on the other hand, weakening AdX’s exclusive advantages over rivals—manifested in the way in which Google rolled out the program.
- (623) Following a series of partial launches and experiments in 2013–2014, Google “fully launched” AWBid in June 2015, but limited it only to remarketing campaigns.⁸⁷² As explained in a 2019 presentation, AWBid was originally launched for remarketing because “remarketing is where Adwords faces the most competitive pressure and most benefit from additional reach.”⁸⁷³ Google expanded AWBid to other categories in 2018.⁸⁷⁴
- (624) Nonetheless, even though AWBid allows Google Ads to bid on rival exchanges for certain impression categories, it targets significantly higher margins than those on AdX. In a 2023 filing, Google notes that when bidding on third-party exchanges with AWBid, Google Ads targets a 32% aggregate margin for remarketing ads and 50% for other ads (in contrast to a 15% aggregate margin when

⁸⁷¹ GOOG-DOJ-03872448, at -448 (04/17/2013).

⁸⁷² GOOG-AT-MDL-006218271, at -280 (01/06/2023) (Google announced the introduction of AWBid via a blog post in May 2016). *See* Sridhar Ramaswamy, “Ads and analytics innovations for a mobile-first world,” Google Ads & Commerce Blog, May 24, 2016, <https://blog.google/products/ads/ads-and-analytics-innovations-for-a-mobile-first-world/>. *See also* GOOG-DOJ-03608886, at -888 (05/09/2013) (“Pilot focused on advertisers with unspent remarketing budget on GDN”); GOOG-DOJ-09916600, at -600 (08/16/2013), (Noted Awbid “will impact a historical AdX differentiator for our publisher sales team – being the only exchange with bid-based AdWords demand”; also noted that “AdWords will not bid the same on other exchanges[.] In AdX / AdSense, AdWords provides to bids and second prices itself regularly [.] On other exchanges, AdWords will only bid once”).

⁸⁷³ GOOG-DOJ-14298902, at -903 (10/04/2019) (“Remarketing is where Adwords faces the most competitive pressure and most benefit from additional reach... Back in 2014, 2015 - GDA remarketing was facing still competition from industry... One of the reasons was not having access to diverse inventory. Awbid’s primary goal since its start has been to increase the inventory access to GDA remarketing & dynamic remarketing customers”).

⁸⁷⁴ GOOG-DOJ-14298902, at -903 (10/04/2019) (“Originally launched for remarketing ads, expanded to topic, in-market, affinity, icm vertical, and CIA/CIM targeting types in late 2018 & early 2019.”). Topic targeting involves placing ads on websites that focus on a topic that the advertiser’s customers might be interested in. *See* Google, “About topic targeting,” Google Ads Help, accessed December 16, 2023, <https://support.google.com/google-ads/answer/2497832?hl=en>. Google defines in-market targeting as going after customers that are “researching products or services and actively considering buying something like what [the advertiser] offer[s].” *See* Google, “In-market audience targeting,” Display & Video 360 Help, accessed December 16, 2023, <https://support.google.com/displayvideo/answer/6213232?hl=en>. Affinity targeting involves reaching customers “based on what they’re passionate about and their habits and interests.” *See* Google, “About audience segments,” Google Ads Help, accessed December 16, 2023, <https://support.google.com/google-ads/answer/2497941?hl=en>. Vertical targeting involves targeting ads based on “market verticals, and the content of webpages.” *See* Google, “Category targeting,” Display & Video 360 Help, accessed December 16, 2023, <https://support.google.com/displayvideo/answer/2697826?hl=en>; GOOG-AT-MDL-000876511, at-511 (12/11/2019) (Custom targeting allows publishers to target users who have entered certain keywords or have visited specific URLs or apps). *See also* Google, “About custom segments,” Google Ads Help, accessed December 16, 2023, <https://support.google.com/google-ads/answer/9805516?hl=en>. A Google document noted that following this expansion, over 57% of AWBid revenue would still come from remarketing, *see* GOOG-DOJ-03247924, at -924 (09/05/2019). The 57% was calculated by dividing the sum of AWBid’s existing remarketing revenue (\$350m) and its incremental remarketing revenue (\$345m) by the sum of AWBid’s existing remarketing revenue (\$350m) and total incremental revenue (\$863m).

placing bids on AdX).⁸⁷⁵ (Below, I corroborate this with my own analysis of the data produced in this matter.) Part of the rationale for a higher margin through AWBids, as explained in a December 2014 presentation, was that a “32% margin and no 2nd price makes it less desirable to access [Google Ads] via a middle-man”⁸⁷⁶—i.e., through a rival exchange. Google Ads’ bids will be lower through rival exchanges and rival exchanges would win impressions less often.

- (625) As the AWBids program makes evident, Google Ads possessed the ability to bid into rival exchanges, thereby providing Google Ads’ advertisers with greater access (and potentially at lower prices) to publisher inventory, and providing publishers using rival ad exchanges the benefits of competition from Google Ads’ bidders.
- (626) However, numerous Google documents indicate the risk that AWBids posed to undermining AdX’s advantages over rival exchanges. For example, a Google presentation regarding the expected impact of allowing Google Ads to bid on third-party inventory stated that “Publisher inventory shifts are potentially far more dramatic than expected gain in advertiser spend.”⁸⁷⁷ In a January 2016 email, then-Google Global Display Publisher Sales Strategy Lead Bryan Rowley elaborated on this point, stating that “[c]annibalization from AWBids buying could accelerate publishers shifting inventory or assigning priority to competitive SSPs/Exchanges.”⁸⁷⁸ Several other Google documents indicated that the AWBids program might incentivize publishers to use or prioritize other exchanges and weaken AdX’s value proposition over rivals.⁸⁷⁹

⁸⁷⁵ See GOOG-AT-MDL-006218257, at -264 (12/16/2023) (This rate has changed over time: “Since the beta launch of AWBids, the take rate targeted by Google Ads varied between 20% and 32%... In around December 2015, Google Ads began varying the take rate it targeted on AWBids to between 0% and 32% on publishers with lower traffic and some other domains... In August 2016, Google Ads changed the take rate it targeted on AWBids to an average 15% across all AWBids spend (with the take rate potentially varying on individual queries between -15% and 32%), and a minimum 20% on inventory that could be bought through Ad Manager (i.e. non-incremental inventory)... In November 2017, Google Ads removed the distinction between incremental and non-incremental inventory and targeted a 15% take rate on all inventory... In early 2018, Google Ads changed the minimum take rate on non-incremental inventory to 32%, while keeping the overall take rate it targeted at 15% per exchange... When AWBids was expanded to include non-remarketing targeting types in around November 2018, Google Ads changed the take rate it targeted to a fixed 32% for remarketing and 50% for other targeting types.”).

⁸⁷⁶ GOOG-DOJ-07810578, at -593 (12/04/2014). (A 32% margin on AWBids plus a margin levied by a third-party exchange would be greater than the combined average Ads-AdX margin (i.e., an average 20% Ads margin and 15% AdX margin yields a combined margin of 32% (= 1-(1-.2)x(1-.15)). Prior to 2019, Google Ads submitted two bids into AdX; see GOOG-AT-MDL-006218271, (Google’s Jan 6, 2023 response to European Commission’s RFI 10), at 284286 (01/06/2023). AWBids did not submit two bids into rival exchanges. See GOOG-AT-MDL-013106294, at -301 (01/27/2017) (“On AdX, DBM competes with GDN, which submits two dynamically adjusted bids. On some third party exchanges, DBM competes with AWBids, which submits only one bid”).

⁸⁷⁷ GOOG-DOJ-14826585, at -592 (n.d.).

⁸⁷⁸ GOOG-DOJ-10948271, at -271 (01/06/2016). See also GOOG-DOJ-14432746, at -748 (12/2015).

⁸⁷⁹ See GOOG-DOJ-11765613, at -614 (12/12/2015) (“Despite the steps taken today to favor sell-side products, by allowing GDN to buy cross-exchange the spend on sell-side products could be directly reduced thereby slowing the growth of the sell-side business... the value proposition of our sell-side products will be greatly impacted by the news of GDN buying cross-exchange. AdX, AFC and AdMob have each and collectively touted the fact that they were the only product(s) capable of providing GDN demand... [e]ven during the life of AWBids our Exchange partners have been contractually obligated to keep this fact secret.”); GOOG-DOJ-03637904, at -904 (07/10/2019) (that “The AWBids

- (627) Google documents also describe expectations that competitive pressure would arise from third-party access to Google Ads demand. A 2015 document stated that “[r]egardless of the financial reality the value proposition of our sell-side products will be greatly impacted by the news of GDN buying cross-exchange,” and that “during the life of AWBid our exchange partners have been contractually obligated to keep this fact secret.”⁸⁸⁰ The document further states that “[w]hen our competition is able to say they have access to GDN, whether it is equal or not, our sales and marketing teams will have to be prepared for significant competitive pressure.”⁸⁸¹
- (628) Since its launch, AWBid has not gained a large fraction of Google Ads’ spending. A 2015 document indicates that “[a]s of November 2015, GDN is spending ~\$230K per day (1.2% of total GDN spend) via AWBid”⁸⁸² and that guidance for 2016 “currently reflects daily AWBid spending increasing to ~\$900K per day (2.3% of total GDN spend, 7.6% of GDN remarketing spend).”⁸⁸³ A July 2018 document noted that AWBid represented “3.5% of GDN gross revenue”.⁸⁸⁴
- (629) I have examined Google Ads’ purchasing behavior using data that have been produced in this matter. Since 2014, Google Ads impressions won through non-Google products (i.e., not AdX or AdSense) have not represented a meaningful proportion of Google Ads demand. As shown in Figure 66., almost all of Google Ads demand was sourced through AdX or AdSense. During the period January 2014–March 2023, “non-Google inventory” (i.e., impressions not served through AdX, AdSense, or Demand Product) accounted for approximately 3% of Google Ads’ open-web display impressions, with AdX and AdSense accounting for over 97%.⁸⁸⁵ In 2022, “non-Google inventory” accounted for less than 6% of Google Ads’ impressions.⁸⁸⁶ These percentages are similar to those based on revenues from a 2020 Google document that reported 2019 Ads’ revenues as 3.6B through AdX, 2.9B through AdSense, and 0.4B through non-Google sources.⁸⁸⁷

initiative has some risk in that it is offering additional revenue to AdX’s competitors, and is weakening one of AdX’s unique selling points (access to Google AdWords demand.)”); GOOG-DOJ-14826585, at -586 (n.d.) (“The enablement of AdWords on 3rd party inventory sources will incentivize clients to move from AdX and AdSense to Rubicon, PubMatic, and AdMeld.”).

⁸⁸⁰ GOOG-DOJ-11765613, at -614 (12/12/2015).

⁸⁸¹ GOOG-DOJ-11765613, at -614 (12/12/2015).

⁸⁸² GOOG-DOJ-11765613, at -613 (12/12/2015).

⁸⁸³ GOOG-DOJ-11765613, at -614 (12/12/2015).

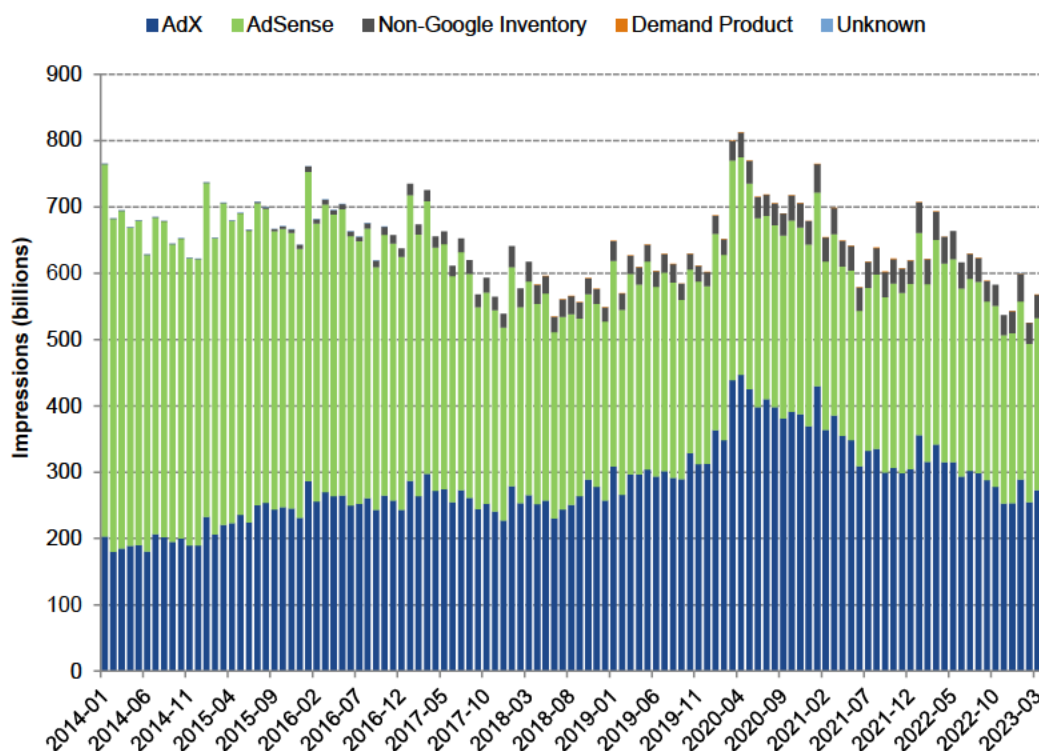
⁸⁸⁴ GOOG-DOJ-AT-02118579, at -580 (07/11/2018).

⁸⁸⁵ Subject to the data limitations applied to Figure 66. and excluding Google O&O properties. These figures are for worldwide impressions; statistics based on impressions from US advertisers are similar, with 4% of Ads’ open-web impressions in 2022 being sourced from non-Google inventory.

⁸⁸⁶ I conservatively excluded Google owned-and-operated (O&O) properties from these calculations. Including Google O&O properties would increase the denominator and therefore decrease the “non-Google inventory” percentage of Google Ads open-web display impressions. Advertisements placed through Google Ads can appear on Google Finance, Gmail, Blogger and YouTube. *See* Google, “Where your ads can appear”, accessed December 17, 2023, <https://support.google.com/google-ads/answer/1704373?hl=en>.

⁸⁸⁷ GOOG-DOJ-09559968, at -972 (01/30/2020).

Figure 66. Google Ads purchases primarily through AdX and AdSense (worldwide impressions)



Source: Google Ads data (DOJ RFP 54).

Notes: Limited to worldwide indirect open-web display impressions. Excludes impressions on Google properties. Google Ads accesses non-Google inventory through AWBId see GOOG-DOJ-05244847, at -849, (02/23/2011). Google employees have used the term “Non-Google inventory” in the context of AWBId, see GOOG-DOJ-03234677, at -677 (05/11/2016).

- (630) Using Google’s log-level data from June 2023, I calculate that AdX’s share of Google Ads worldwide indirect open-web display impressions on ad exchanges is 91% and third-party exchanges’ share is 9%.⁸⁸⁸ These data also allow me to examine how competitive Google Ads is when bidding across different exchanges. For this set of impressions, when Google Ads bid into an AdX auction, Google Ads (and AdX) won the impression 26% of the time; however, when Google Ads bid into a rival exchange, it won the impression through that rival exchange 1% of the time.⁸⁸⁹ This wide difference in “win rates” when Google Ads bids into AdX versus when it bids into a rival ad exchange is consistent with Google Ads’ bids into rival exchanges being less competitive than those it submits

⁸⁸⁸ Google Ads-AdX log-level data; Google Ads-Third Party Exchange log-level data (see Appendix H.1). I exclude AdSense from the calculation to highlight the share of Google Ads demand that goes to AdX versus non-Google rival ad exchanges; including AdSense would increase the share of Google Ads demand that goes to Google products (AdX or AdSense).

⁸⁸⁹ This low win rate on rival ad exchanges is comparable to, but lower than, a 2019 Google presentation that reported a 3% “win rate” for AWBId (GOOG-DOJ-14298902, at -911 (10/04/2019). Note that Google Ads’ win rate when bidding into AdX compares impressions that Google Ads bids on and wins against impressions that Google Ads bids on but does not win, regardless of whether AdX ends up serving the impression. Hence, Google Ads’ win rate when bidding on AdX is not the same as Google Ads’ share of transactions that AdX wins.

harmed their competitiveness by exclusively providing access to AdX's real-time bids to DFP (see Section VII.F).

VII.C.3.a. AdX Direct has meaningful limitations and limited usage

- (644) Since the introduction of AdX in 2009, Google allowed customers to generate “AdX Direct” tags, which provide a limited way for third-party publisher ad servers to obtain access to AdX demand.⁹¹⁶ Google does not “specifically market AdX Direct to publishers,” and I explain below that AdX Direct had several limitations and comprised only a small fraction of overall AdX revenues.⁹¹⁷
- (645) Notably, in 2012, Google experimented with a limited “third-party dynamic allocation” feature that would have allowed AdX to be used within a non-DFP publisher ad server by passing a “minCPM to beat over to AdX without any advanced functionality.”⁹¹⁸ A 2012 Google “Display Strategy Working Document” noted that this feature “is available today but in beta. Minimal effort is required to roll it out more broadly.”⁹¹⁹ However, this document also noted that a risk was that it “takes away a key differentiator for DFP.”⁹²⁰ A 2012 email thread among Google employees noted that, “[t]o allow dynamic allocation to [a non-DFP publisher ad server] means to delete one of the major arguments to use DoubleClick or Admeld. This weakens the market position for some of our products.”⁹²¹ The beta was officially shut down in 2012.⁹²²

VII.C.3.a.i. AdX Direct does not return real-time AdX bids to publishers using third-party publisher ad servers

- (646) AdX does not integrate with rival ad servers in the same manner as it does with DFP. In particular, internal Google documents discuss an important reason why an AdX Direct tag does not provide publishers using rival publisher ad servers with the same features they would have on DFP: AdX

⁹¹⁶ GOOG-DOJ-27799214, at -215 (“AdX Direct allows publishers to use AdX as a standalone product. This is done by generating AdX ad tags (different from GPT tags) which allows pubs with non-Google ad servers to access AdX (OA & PA only).”, “AdX Direct predates the Google acquisition and AdX-DFP merger”); Neal Mohan, “The DoubleClick Ad Exchange: Growing the Display Advertising Pie for Everyone,” last modified September 17, 2009, <https://googleblog.blogspot.com/2009/09/doubleclick-ad-exchange-growing-display.html>; GOOG-DOJ-11899169. GOOG-DOJ-13233139, at -139 (2019) (“When AdX was first launched as a standalone product, it possessed the ability to generate an ad tag that could be used to request ads from AdX.”).

⁹¹⁷ Letter from David R. Pearl to Kelly Garcia, “Re: *United States, et al. v. Google LLC*, No. 1:23-cv-00108-LMB-JFA,” October 6, 2023, (“AdX Direct is a name given to publisher configurations that integrate with Google Ad Managers’ ad exchange using its ‘Ad Exchange’ tag.’ ... Google does not specifically market AdX Direct to publishers.”).

⁹¹⁸ GOOG-DOJ-15583409, at -410 (02/10/2012). *See also* GOOG-AT-MDL-006218257, at -259 (12/16/2022) (Google’s Dec 16, 2023 response to European Commission’s RFI 10 states, “Third-party dynamic allocation was an experimental feature that would have allowed an ad tag to specify a minimum CPM that the exchange (AdX) must beat in order for an ad from the exchange to be shown. Improve Digital was invited to participate in the beta for this feature but the beta was ended in February 2012.”) *See also* GOOG-DOJ-15583409, at -410 (02/09/2012) (2012 email chain, “[w]e are offering Improve Digital 3rd party dynamic allocation between the DoubleClick Ad Exchange and their proprietary ad server”)

⁹¹⁹ GOOG-DOJ-05247075-0001, at -061 (08/2012).

⁹²⁰ GOOG-DOJ-05247075-0001, at -061 (08/2012).

⁹²¹ GOOG-DOJ-15583409, at -410 (02/09/2012).

⁹²² GOOG-AT-MDL-006218257, at -259 (12/16/2022).

Direct does not return real-time AdX bids to publishers using third-party publisher ad servers, and therefore does not allow AdX's bids to be compared against those received from rival ad exchanges in third-party publisher ad servers.⁹²³ As described in a Google submission to the FCA:⁹²⁴

AdX operates in a combination with third party ad servers through Google Publisher Tag (GPT) passbacks and AdX direct tags. The third party ad server can make a call to AdX, using a GPT passback or AdX direct tag, to serve an ad matching specified targeting criteria. The Ad Manager ad server will then return an ad that matches the specified targeting criteria. **AdX is an ad exchange, and does not directly bid into auctions run by third party ad servers.** A publisher using a third party ad server would have to assign a static CPM price or serving priority to the AdX demand.

- (647) A 2018 Google presentation “Adx Direct Overview” also discusses limitations with AdX Direct, describing AdX Direct contracts as “non-programmatic – meaning we are jammed into another ad server based on average price”.⁹²⁵
- (648) These descriptions are also consistent with testimony from a rival publisher ad server provider. In a 2019 email, James Avery, the founder and CEO of Kevel, a publisher ad server, explained that when using AdX Direct tags, AdX either “wins or doesn’t[.] [Y]ou never actually find out the price it won at. You just get a total CPM for the hour, day, month, etc.”⁹²⁶ When asked about that email in deposition, Kevel’s Mr. Avery testified that when using AdX Direct tags, publishers “will not receive bids. They will receive, basically, ads served. And there’s a distinction because a bid can actually compete in an auction, but an AdX tag will just either serve an ad or not serve an ad.”⁹²⁷ As a result,

⁹²³ GOOG-AT-MDL-001941178, at -179 (11/2017) (““AdX Direct” (AdX publishers who are not on DFP) relationships are suboptimal because bids cannot be passed through to the publisher in real time.”); GOOG-AT-MDL-001937115, at -115 (09/29/2017) (“AdX is disadvantaged in “AdX Direct” relationships because AdX does not integrate with other ad servers as well as it does with DFP (no dynamic allocation), so AdX does not pass through real-time-bids to these other ad servers (instead it passes through a “dumb” flat CPM based on historical averages.”); GOOG-DOJ-15564937, at -937, (09/10/2019) (“AdX does not bid into 3rd-party auctions. So, while you can drop a GPT Passback tag into a 3rd-party ad server (and traffic an AdX line item to that tag), you don’t get a bid price back from AdX that could be used in creative selection, yield optimization, or their own version of dynamic allocation. A publisher using that 3rd-party ad server would have to assign some static CPM price or a serving priority for that AdX demand – it doesn’t compete based on price. So it’s not equivalent to the way AdX integrates with Ad Manager (where we use the bid price to determine whether the AdX demand should serve or not”). GOOG-DOJ-15564937, at -937-938 (09/10/2019) (Hazan and Korula describing AdX Direct tags “more-or-less the same scenario as a GPT Passback from the perspective of not exposing a bid price or participating in an auction,” and “agreed that it’s not in real time, but there is a way to call AdX from the client-side”); GOOG-DOJ-15187593, at -593 (07/09/2015) (“AdX can be called with a minimum specified by the publisher. If AdX beats that min then contractually we have to serve the winning ad. We do not allow the publisher, or any partner we work with, to decide not to serve the add if we beat the provided minCPM...”)).

⁹²⁴ GOOG-DOJ-05782415, at -439 (11/22/2019) (Google submission to FCA, emphasis added).

⁹²⁵ GOOG-DOJ-03634896, at -900 (1/25/2018). *See also* GOOG-DOJ-09159964, at -969 (07/2018) (“An AdX tag booked in a 3p ad server does NOT allow DBM/Adwords bids to compete with other DSPs in real time”)

⁹²⁶ KVL00000945, at -946 (04/25/2019) (In an earlier email from the same conversation, Avery noted, “no one really wants to use [AdX Direct] tags anymore since you end up with passbacks and other inefficiencies.”).

⁹²⁷ Deposition of James Avery (Kevel), August 16, 2023, 34:5–34:14. (“Q. And if the publisher uses an AdX tag, can that publisher receive bids from AdX, Google’s ad exchange? A. They will not receive -- They will not receive bids. They

Mr. Avery explained that using AdX Direct tags to access AdX demand is “[v]ery ineffective” because AdX tags “are not participating in an auction.”⁹²⁸

- (649) In 2019, a Google presentation discussed deprecating AdX Direct and migrating publishers using AdX Direct tags to Google’s Ad Connector (code named Yavin) product, which would allow publishers to connect directly with Google’s DV360 bidding tool (see Appendix K.3).⁹²⁹ However, Google has not deprecated AdX Direct,⁹³⁰ and continues to support it for certain publishers as part of its settlement with the FCA in June 2021.⁹³¹

VII.C.3.a.ii. AdX Direct’s usage by third-party publisher ad servers is limited.

- (650) The 2018 Google presentation related to AdX Direct discussed above and my analysis of data produced in this matter indicate that use of AdX Direct by third-party publisher ad servers represents a small fraction of AdX’s overall transaction and spending volume for open-web display. The limited usage of AdX Direct is thus consistent with it not meaningfully affecting the extent to which rival publisher ad servers are foreclosed from accessing and using real-time AdX demand.
- (651) First, the 2018 “Adx Direct Overview” examined AdX Direct usage across display, mobile app, and video, and indicates that the share of AdX impressions and revenue represented by AdX Direct declined from 2014–2017.⁹³² Focusing on display alone, the presentation notes that in Q4 2017, AdX

will receive, basically, ads served. And there's a distinction because a bid can actually compete in an auction, but an AdX tag will just either serve an ad or not serve an ad.”).

⁹²⁸ Deposition of James Avery (Kevel), August 16, 2023, 35:4–35:22. (“Q. How effective are AdX tags in helping Kevel’s publisher customers get access to Google demand on Google’s ad exchange? A. Very ineffective. Q. What makes you say that? A. I don’t believe any current publishers that work with us are using AdX tags. And the few customers who tried were not happy with the results. Q. Why are AdX tags not effective for accessing Google demand available on AdX via Kevel’s publisher ad server? A. Because, essentially, they are not participating in an auction. It’s either you give them the traffic and the chance to serve or -- or not. And you can -- you can set a floor price, but you can’t -- you can’t have them participate in a full auction.”).

⁹²⁹ GOOG-DOJ-09167513, at -514 (2019).

⁹³⁰ GOOG-DOJ-27799214, at -216 and -221 (02/11/2020) (“Although usage **organically fell 49% YoY**, our plans to start sunseting this product in Q4 were **halted due to legal/PR concerns**”, emphasis in original; “Competition Counsel and PR recommended not to proceed.” Emphasis in original.).

⁹³¹ According to a report by the monitoring trustee of the FCA commitments, commitment 5A required Google to “[c]hange AdX Direct implementation so that the floor price passed to AdX buyers is not set by reference to the willing price sent by the 3P ad server.” See GOOG-AT-MDL-010525710, at -718 (07/29/2022). The report indicated that only six publishers had activated the pricing floors functionality for AdX Direct (the commitment 5A implementation). See GOOG-AT-MDL-010525710, at -750–751 (07/29/2022) (“In terms of usage, 6 [publishers] were enabled, however none actively used the functionality yet”) Of those six publishers, only Dailymotion had actually made use of the feature and “appear[ed] to have sent a limited number of test queries using the feature.” A Google document suggests that third-party publisher ad servers still lack the ability to make real-time comparisons with AdX bids. See GOOG-AT-MDL-012694825, at -825 (10/15/2021) (“the publisher cannot just get back the AdX ad and compare it to the competition in their own ad server, they need an additional private threshold.”).

⁹³² GOOG-DOJ-03634896, at -897 (2018) (“‘AdX Direct’ revenue contribution to sell-side business is shrinking.”) The presentation examines AdX Direct revenue on display, mobile app, and video, with “AdX Direct revenue (Q4 ’17) is highly skewed to Mobile Apps.” See GOOG-DOJ-03634896, at -898 (2018),

document further states that a hybrid setup is “suboptimal”, “adds unnecessary complexity & latency to the partner’s ad stack”, has “known technical limitations”, and concludes that “[w]e [Google] should not be pitching hybrid set-ups.”⁹⁴³

VII.D. Google used DFP’s substantial market power to deny rival exchanges advantages provided to AdX and interfere with publishers’ ability to work with rivals

(657) In this Section, I discuss how Google used DFP’s substantial market power to deny rival exchanges advantages provided to AdX and inhibit publishers’ ability to work with rivals:

- In Section VII.D.1, I discuss how Google, until the introduction of Exchange Bidding, provided only AdX with the ability to participate in Dynamic and Enhanced Dynamic Allocation within DFP. Google exclusively provided AdX with this advantage—and the associated benefits of “first look” and “last look”—and left rival exchanges with fewer and less valuable impressions to bid upon within DFP.
- In Section VII.D.2, I discuss how Google introduced variable floor restrictions within DFP, which eliminated the ability of publishers to set lower reserve prices (i.e., price floors) for third-party exchanges than for AdX, thereby impeding publishers’ ability to steer more of their impressions to AdX’s rivals.

(658) Later, in Sections VII.F.1.b and VII.F.1.c, I discuss how these actions harmed the competitiveness of rival exchanges.

(659) These actions also increased the effectiveness of exclusive access to and use of real-time bids from AdX to DFP (discussed in Section VII.C above) because rival publisher ad servers had worsened non-AdX ad exchanges to work with. Hence, the actions taken by DFP to weaken rival exchanges described here, and the exclusive access to AdX’s real-time bids provided to DFP described earlier, served to reinforce one another.

VII.D.1. Google exclusively provided AdX with Dynamic and Enhanced Dynamic Allocation, denying “first look” and “last look” advantages to rival exchanges

(660) In Section II.E.2 I described Dynamic Allocation (DA), a feature Google provided within DFP since the launch of AdX. DA allowed publishers to use real-time bids from AdX to compete with directly booked, non-guaranteed ads within DFP. In Section II.E.2 I also discussed Enhanced Dynamic

⁹⁴³ GOOG-DOJ-32280764, at -765-766 (07/2019).

Allocation (EDA), which Google launched in 2015 and allowed real-time bids from AdX to compete also against guaranteed ads.

- (661) At the time when DA was first introduced, publishers sold most of their inventory through direct deals.⁹⁴⁴ During this time, DFP utilized a “waterfall process” to determine how the publisher’s non-guaranteed or remnant inventory would be sold. DFP would first attempt to satisfy any contractual obligations by calling on the guaranteed line items set up by the publisher, which would fill an impression with an ad from the publisher’s guaranteed deals. However, if no guaranteed line items were eligible to fill a given impression, DFP would attempt to sell the inventory by sequentially calling on a series of non-guaranteed line items; if a non-guaranteed line item cleared a floor price set by the publisher, the impression would sell, else it would be passed to the next line item.⁹⁴⁵ The order in which these items were called in the waterfall was manually entered into DFP by the publisher, and typically was based on the historical average price generated by the advertiser ad network or a fixed-price that the publisher negotiated with the network.⁹⁴⁶
- (662) When DA was introduced, it allowed AdX to compete in real time against the non-guaranteed line items booked into DFP.⁹⁴⁷ Before passing inventory to the waterfall, the highest price (in terms of CPM) associated with any non-guaranteed line item would be passed into AdX as the floor price, which would then be shared with all Google and non-Google buyers on AdX.⁹⁴⁸ AdX would win the impression if it were able to produce a bid higher than the established floor price. This functionality was extended in 2015 when Google released Enhanced Dynamic Allocation. EDA allowed AdX to compete in real-time against guaranteed line times, using an adjusted version of the price of the guaranteed deal as the floor price of the AdX auction.⁹⁴⁹

⁹⁴⁴ GOOG-AT-MDL-006217592, at -605 (12/12/2022).

⁹⁴⁵ GOOG-AT-MDL-006217592, at -605 (12/12/2022); GOOG-DOJ-AT-00292252, at -255 (In a 2019 “AdX first-price bidding” presentation on a slide titled “Waterfall setup,” Google explains how “line items were called in decreasing order of their historical CPMs”).

⁹⁴⁶ Note that the price entered into DFP is not necessarily the price that would be produced when the line item is called. *See* GOOG-DOJ-14156104, at -105 (In a 2016 email exchange describing a hypothetical EDA scenario, one Google employee states that “with EDA on we set the reserve price at \$1, and any AdX buyer including GDN can win over the query as long as they bid more than \$1. This transaction happens before we actually call PubMatic and get their actual bids”).

⁹⁴⁷ GOOG-DOJ-10438778, at -778 (2010 Google email thread discussing Dynamic Allocation, “DoubleClick Ad Exchange sells non-guaranteed display advertising through an auction when it can yield a higher price than what could be obtained through fixed, pre-negotiated, upfront sales to ad networks”); GOOG-AT-MDL-006217592, at -605 (12/12/2022) (“Dynamic Allocation is the feature that enabled publishers to solicit real-time bids from DoubleClick’s ad exchange (known as AdX) for ad impressions not fulfilled by guaranteed line items”).

⁹⁴⁸ GOOG-AT-MDL-006217592, at -605 (12/12/2022) (“Using Dynamic Allocation, DFP established a ‘floor price’ for AdX bids to beat, based on the highest price of any of the publisher’s booked, static remnant line items (which a publisher ‘booked’ by manually configuring the estimated price of each remnant line item of based on a fixed-price the publisher had negotiated with a particular remnant demand partner). AdX buyers would then submit real-time bids to try to beat this floor. The floor price was shared with all AdX buyers: meaning all Google and non-Google AdX buyers.”)

⁹⁴⁹ GOOG-DOJ-04429792, at -816 (04/2017) (A slide deck: “Monetization Cheatsheet” states that EDA allowed AdX to “compete in real time with guaranteed campaigns using the CPM of the direct sale as a floor price”); Google, “Line item types and priorities,” Google Ad Manager Help, <https://support.google.com/admanager/answer/177279?hl=en>.

- (663) An internal Google document described the benefits of DA as “allow[ing] publishers to maximize their earnings by getting the highest paying ad available for any given ad impression.”⁹⁵⁰ It noted two benefits: introducing real-time competition from AdX, and filling remnant inventory “when no other campaigns are available to run in that ad unit (backfill).”⁹⁵¹ Another Google document noted that publishers benefited from DA.⁹⁵²
- (664) However, critically, only AdX was initially allowed to compete in real time against guaranteed- and non-guaranteed line items within DFP’s DA and EDA features.⁹⁵³ Other exchanges were not provided with this opportunity by DFP before Google’s Exchange Bidding, which was fully launched in 2018.⁹⁵⁴
- (665) The rest of this Section is organized as follows.
- In Section VII.D.1.a, I describe the Dynamic and Enhanced Dynamic Allocation programs, and how DFP’s exclusive provision of them to AdX provided AdX with first- and last-look advantages over rival exchanges;
 - In Section VII.D.1.b, I describe how AdX was able to further benefit from these advantages with a program known as “AdX Dynamic Revenue Share”;

AdX was also the exclusive provider of real-time EDA bids until the release Exchange Bidding. *See* GOOG-DOJ-14156104, at -105 (09/20/2016) (email chain between Google employees describing how “third-party exchanges cannot compete with AdX through EDA on the similar footing”); GOOG-DOJ-AT-00589814, at -823 (01/28/2019) (“Unified auction in Google Ad Manager” presentation, “With exchange bidding, 3rd party exchanges are now able to bid in real time for your inventory through dynamic allocation”); GOOG-AT-MDL-001793318, at -366 (2021) (Google “RTB Insights” deck, “Open Bidding also allows other third-party exchanges to participate in EDA”). Google charged third party exchanges a 5% revenue share when buying ads through DFP’s Dynamic Allocation. *See* GOOG-DOJ-15277215, at -222 (05/05/2016).

⁹⁵⁰ GOOG-DOJ-03601149, at -151 (12/15/2011).

⁹⁵¹ GOOG-DOJ-03601149, at -151 (12/15/2011) (“Dynamic allocation with DFP* and AdX/AFC maximizes publishers’ yield in two ways: 1. By serving AdX/AFC whenever they offer more than the competing booked ad networks (real-time competition) 2. By serving AdX/AFC when no other campaigns are available to run in that ad unit (backfill).”).

⁹⁵² GOOG-DOJ-03610481, at -499 (04/2014) (“When AdX partners use Dynamic Allocation, there is an uplift of eCPMs by over 20%”).

⁹⁵³ GOOG-TEX-00083092, at -092 (09/28/2016) (Google’s Senior Engineering Director of Publisher Ads Aparna Pappu explaining that “dynamic allocation with DFP ONLY worked with AdX and not any other exchange”). *See also* GOOG-DOJ-05782415, at -438 (11/22/2019) (Google submission to FCA, “When first launched, Dynamic Allocation did not facilitate competition between multiple exchanges in real time. Third party exchanges could compete only at a fixed price... To facilitate competition between multiple intermediation platforms, AdX would have had to make calls to third party ad exchanges to bid for ad inventory purchased in the auction... With the introduction of Header Bidding, third-party demand sources were able to compete dynamically in the Ad Manager (then DFP) auction.”)

⁹⁵⁴ GOOG-DOJ-05782415, at -432 (11/22/2019) (Google submission to FCA, “Exchange Bidding is a server-to-server feature of Ad Manager that builds upon the existing capabilities of Enhanced Dynamic allocation... It allows third party ad exchanges to compete with line items booked in Ad Manager and with AdX in a unified real time auction.”) As I discussed in Section II.E.3, header bidding emerged as a way for publishers to circumvent Google’s restrictions and bring in real-time competition from rival exchanges by running an auction outside of DFP. GOOG-DOJ-05782415, at -439 (11/22/2019) (“With the introduction of Header Bidding, third-party demand sources were able to compete dynamically in the Ad Manager (then DFP) auction.”).

- In Section VII.D.1.c, I explain that AdX meaningfully benefitted, and rivals were meaningfully adversely impacted, from these exclusive advantages provided by DFP.

VII.D.1.a. Dynamic and Enhanced Dynamic Allocation provided AdX with “first look” and “last look” advantages over rival exchanges

- (666) DA and EDA provided AdX with what has been referred to as a “first look” at inventory coming from DFP.⁹⁵⁵ Since DA allowed AdX to compete against the highest remnant line item, AdX could view and purchase an impression before any network or exchange in the waterfall had an opportunity to provide a real-time bid.
- (667) Statements from Google documents acknowledged the benefits of AdX’s privileged access to DFP inventory.⁹⁵⁶ For example, a 2015 Google “DFP Mediation” presentation outlines two ways in which “first look [is] crucial”: “1. First look allows access to the most valuable cookies, hence the highest paying impressions. 2. Without first look, we are left with inventory that other buyers have had a look into and didn’t want to pay for.”⁹⁵⁷
- (668) Since AdX historically competed against static or historical prices of line items in the waterfall, AdX was able to bid on impressions before the other demand sources in the waterfall had an opportunity to produce a “live” price (even though the live price could have been higher than the winning AdX bid), thereby allowing AdX to win an impression even if some other demand source was willing to pay more.⁹⁵⁸ This reduced publisher revenues and the efficiency of the auction relative to having these demand sources compete in real time with each other.
- (669) In a 2016 email, then-Google Managing Director of Global Publisher Solutions and Innovation Jerome Grateau noted explicitly that AdX’s exclusive access to EDA allowed it to win without necessarily providing the best price to publishers: “[T]he ‘internal’ objective of our Sell-Side platform

⁹⁵⁵ This is distinct from what has been referred to as “DoubleClick First Look,” introduced in 2016 (see GOOG-DOJ-AT-02199478, at -516-521 (10/26/2018) (“First Look AdManager features allows publishers to offer certain buyers an ability to buy selected inventory ahead of any reservation campaigns as long as they bid above a first look floor”); DoubleClick Publisher Blog, “Delivering yield, speed, and control with DoubleClick for Publishers First Look,” December 1, 2015, DoubleClick Publisher Blog, <https://doubleclick-publishers.googleblog.com/2015/12/delivering-yield-speed-and-control-with.html>

⁹⁵⁶ See GOOG-DOJ-01439665, at -668 (02/11/2009) (Transcript of David Rosenblatt’s (former DoubleClick CEO) overview of Google’s display strategy) (“If you don’t have access to that inventory, nothing else matters. It turns out that the most efficient way to access that inventory is by owning the primary ad server that premium and non-premium publishers use to manage their inventory. It allows you as a network the so called ‘first look’ at each impression”). See also GOOG-DOJ-01657697, at -729 (03/15/2007) (A 2007 Google document regarding DoubleClick which acknowledges that DoubleClick would allow Google “to ‘cherry-pick’ inventory without implications of pass-back”).

⁹⁵⁷ GOOG-DOJ-10547033, at -064 (05/2015).

⁹⁵⁸ GOOG-DOJ-AT-00292252, at -256 (10/10/2019) (In a Google slide describing the problems with the waterfall setup, the slide acknowledges that “line items were compared on their average CPMs not their ‘live CPMs’.” The slide also shows an example where the second line item has a historical CPM of \$1.5, but a “Live” CPM of \$3. Since the first line item has a historical CPM of \$2, Dynamic Allocation would allow AdX to compete in real-time against the \$2 price, potentially allowing AdX to win at just over \$2 before the second line item could produce a live price of \$3).

is to maximize our access to inventory. We managed historically to have an advantage through EDA vs other sources of demand...so our demand could win even if we did not provide the best CPM on a specific impression.”⁹⁵⁹

- (670) Also, in 2017, Google’s Director of Global Revenue Intelligence Michelle Dauwalter acknowledged another potential implication of its first look advantage when discussing the hypothetical disadvantages of “spinning off DoubleClick”:⁹⁶⁰

Our buyers enjoy a competitive advantage from dynamic allocation because they receive first look on inventory, which inherently provides higher CPMs (from which Google benefits on the rev share). Launching AdX into a non-DFP server destroys this competitive first look advantage and would most likely lead to AdX (1) losing access to overall queries, and (2) losing access to the *highest-value* queries. **From there, it becomes a self-fulfilling prophecy in that less-valuable inventory begets lower CPMs, publishers react by decreasing inventory access, which begets even lower CPMs.**

- (671) By preventing other exchanges from being called upon in Dynamic Allocation, Google subjected its *rivals* to precisely the dynamic Dauwalter described. Because AdX could purchase queries before remnant line items could provide a bid, AdX could “cherry pick” higher value queries (i.e., those queries that advertisers were willing to bid more for) before its rivals. In turn, this would reduce the CPMs that rivals—whenever called—would be able to deliver, reducing their historical performance. If this occurred, as the statement indicates, publishers would likely react by “decreasing inventory access” to these rivals by ranking rival exchanges lower in the waterfall (e.g., if rankings are based on historical outcomes) or no longer calling them, leading to even lower CPMs for those rival exchanges.
- (672) This “self-fulfilling prophecy” whereby “less-valuable inventory begets lower CPMs... which begets even lower CPMs” is related to an economic feature of selection markets:⁹⁶¹ here, the impressions left for rival exchanges after AdX had its first look (and passed them over) tend to be less valuable, thereby lowering the expected CPM performance of those rivals on the impressions they are able to compete for and win. Indeed, despite imposing disadvantages on its rivals by keeping DA and EDA

⁹⁵⁹ GOOG-TEX-00104315, at -315 (09/15/2016).

⁹⁶⁰ GOOG-DOJ-04830048, at -048 (09/05/2017) (emphasis added).

⁹⁶¹ In selection markets where transactions differ in value, firms have an incentive to engage in “cherry-picking” or “cream-skimming” more valuable transactions, leaving behind the less valuable ones. See Liran Einav, Amy Finkelstein, and Neale Mahoney, “The IO of Selection Markets,” *Handbook of Industrial Organization, Volume 5*, eds. Kate Ho, Ali Hortaçsu, and Alessandro Lizzeri (2021), 390–426. With AdX’s first-look advantage, impressions that AdX did not purchase and other ad exchanges could then bid on were likely to be lower value than those impressions that AdX did purchase.

exclusive to AdX, a 2016 Google document acknowledged the negative effects that rivals bidding first could have on AdX.⁹⁶²

- (673) When header bidding emerged, AdX’s exclusive access to Dynamic Allocation became referred to as a “last look” advantage against header-bidding exchanges. The reason is that, previously, other remnant line items in DFP reflected historical or static prices. However, under header bidding, rival exchanges could submit real-time bids for consideration *before* DFP was called, and the winning bid from the header bidding auction could be then used to compete against AdX within DFP.⁹⁶³ Under Dynamic Allocation, AdX was able to use the winning header-bidding price as a floor: if the price produced in the AdX auction surpassed the reserve price generated through header bidding, AdX would win the impression.⁹⁶⁴ This advantage was referred to as a “last look,” since AdX was given an opportunity to win impressions *after* other header-bidding exchanges already submitted bids.⁹⁶⁵
- (674) Figure 68 from a 2019 Google presentation illustrates this “Last Look” dynamic, whereby the bid from the winning header bidder (“HB winner”) is used as a floor within the AdX auction. In the Figure, as long as one of the buyers within the AdX auction had a bid greater than the floor, AdX would win.

⁹⁶² See GOOG-DOJ-13205878, (08/08/2016) (“Our competitors are cherry picking higher value impressions at a low fill rate (<20%) and then passing the leftovers to be filled by Google. This tactic is leading them to appear as being a high performing partner and Google increasingly being a long tail network with lower CPMs.”)

⁹⁶³ See Figure 151 in Appendix L.2.a. See also GOOG-DOJ-15277215, at -221 (05/05/2016).

⁹⁶⁴ GOOG-DOJ-15277215, at -221 (05/05/2016).

⁹⁶⁵ GOOG-AT-MDL-008106705, at -709 (03/04/2019) (“Unified 1st Price Auction” deck states “This is what the industry refers as ‘last look’, where AdX is called last to see if any bid can beat the remnant price”).

- (682) Note that this exercise likely understates the impact of removing the 5% or 10% Open Bidding fee on rival ad exchanges. The reason is that the simulation holds fixed all other bids and does not account for additional exchanges participating through Open Bidding if Google removed the fee.⁹⁸¹ Such adjustments would likely lead to a much larger shift in transactions won by non-AdX exchanges.

VII.D.1.b. Google's AdX Dynamic Revenue Share program enhanced Google's Last Look advantage

- (683) A May 2014 document described an AdX dynamic revenue sharing (AdX DRS).⁹⁸² Similar to Google's buy-side dynamic revenue share programs that I describe in Appendix L.4, AdX DRS dynamically adjusted AdX's standard 20% take rate per-query in order to clear the floor price, and hence win more auctions.⁹⁸³
- (684) In the original version of AdX DRS, the take rate was allowed to go between 0 and 20%.⁹⁸⁴ As an example, if the top bid into AdX was \$1 and the publisher's floor was less than \$0.8, AdX would be able to deduct a revenue share of 20% from the \$1 bid and still provide the publisher with a bid that clears the floor. If however the publisher's floor—potentially reflective of the highest header bidding bid—was \$0.9, AdX under a fixed-revenue share of 20% would not be able to win the auction. However, under AdX DRS, AdX could adjust the revenue share in this auction—here, to 10%—and still win the auction by paying out \$0.90 to the publisher and collecting \$1 from the winning bidder.
- (685) Google began a 1% experiment in May 2014,⁹⁸⁵ and the program launched in August 2015.⁹⁸⁶ With this first implementation, the margin AdX charged could only decrease.⁹⁸⁷ With AdX DRS v2, launched in December 2016,⁹⁸⁸ AdX was able to impose greater-than-20% margins for auctions where this would not alter the outcome in order to bring each publisher's average to its contracted rate.⁹⁸⁹ The intuition here was similar to Project Bernanke (see Appendix L.4): by charging lower

⁹⁸¹ See, e.g., GOOG-TEX-00082594, at -610–611 (07/30/2015). See also GOOG-TEX-00082594, at -611 (07/30/2015) (describing a 0-3% Open Bidding fee leading to “[v]ery quick adoption due to low cost,” and “[b]uyers flee AdX”); see also Deposition of John Gentry (OpenX), October 26, 2023, 114:12–114:24 (“Q. Why would OpenX prefer to connect to a publisher through Prebid instead of through Google exchange bidding? A. Publishers prefer us to connect -- we would like to get more of their demand through Prebid and not through Google. We also would like to connect through Prebid as it's, in many cases, a client-side implementation, which gives us a view to the page, better data. And then lastly, we don't -- there's not 5 percent taken out of our bid if we go through Prebid and not OB.”).

⁹⁸² GOOG-DOJ-06867901, at -901 (05/09/2014).

⁹⁸³ In October 2016, Google stopped applying Sell-Side DRS to DV360 (DBM), but continued applying it to third-party AdX buyers. GOOG-DOJ-14734878, at -878 (11/09/2016), GOOG-DOJ-15085583, at -585 (02/22/2017).

⁹⁸⁴ GOOG-DOJ-06867901, at -901 (05/09/2014).

⁹⁸⁵ GOOG-AT-MDL-004111279, at -279 (05/02/2014).

⁹⁸⁶ GOOG-DOJ-15422498, at -398 (08/15/2015).

⁹⁸⁷ Evidence indicates that the average margin reduced to “around 18%.” GOOG-DOJ-07330182, at -184 (11/21/2016).

⁹⁸⁸ GOOG-AT-MDL-B-000210650, at -650 (12/07/2016) (The launch status of “Dynamic Revshare v2 on Ad Exchange for AdX Buyers” was changed to “Launched.”)

⁹⁸⁹ GOOG-DOJ-14746723, at -724 (06/30/2019), GOOG-DOJ-13221355, at -355 (01/04/2019). See also GOOG-AT-MDL-006218257, at -259 (12/16/2022) (publishers were able to disable DRS).

revenue shares on more “competitive” queries and charging higher revenue shares on less competitive ones, Google could still target a 20% margin overall while winning more impressions. Google documents describing experiments indicate that AdX DRS led to a significant increase in AdX revenues and impressions won by AdX.⁹⁹⁰

- (686) Because AdX was provided with the reserve price that it had to clear under Dynamic Allocation, AdX DRS could adjust the take rate in a manner that guaranteed it would win the impression as long as the highest bid within AdX (not accounting for AdX’s take rate) exceeded the reserve. In this sense, AdX DRS was a way for AdX to take further advantage of the already existing benefits provided with its exclusive access to Dynamic Allocation, and the associated first- and last-look benefits that it provided.⁹⁹¹
- (687) This characterization is consistent with how a Google employee in a 2017 email described AdX DRS: “AdX gets last look over AppNexus... AdX gets to pay high and win whenever AppNexus is present with a high CPM, and can pay low when AppNexus bids low. AppNexus in contrast can’t reliably save money on queries where AdX bids low, because it doesn’t know AdX bids... **dynamic revshare is just yet another way for AdX to exploit the last look advantage.**”⁹⁹²
- (688) According to Google, AdX DRS was discontinued in September 2019 following the launch of the Unified First Price Auction.⁹⁹³

⁹⁹⁰ GOOG-DOJ-14712011, at -012–013 (12/04/2014) (An email describing an AdX DRS experiment, “seeing a 12% increase in AdX revenue (~\$350m ARR) with +11.88% in matched queries...In the medium term, we expect the margin for AdX buyers to settle at 19% and at around 31.15% for AdWords buyers, with profit also going up by about 6% in total from better match rate”); GOOG-DOJ-13235100, at -101 (04/2016) (A Google presentation, “Overall Pub Yield With DRS(V2)”, states, “Overall impact: +2.80% lift in publisher revenue including remnant[.] +4.17% lift in publisher revenue (excluding remnant[.] +3.54% lift in Google (AdX) revenue[.] +1.82% lift in Google (AdX) profit (net revenue)”).

⁹⁹¹ In July 2018, Google introduced a new iteration of Sell-side DRS, known as “truthful DRS” (tDRS): according to Nitish Korula, “tDRS, which launched in July 2018, adjusted AdX’s revenue share before sending bid requests to AdX buyers. If tDRS predicted that a buyer would bid above the AdX floor price for an impression (unless that floor price was determined by Google’s Reserve Price Optimization program), then Google would take a 20% revenue share for that impression. On the other hand, Google took a 0% revenue share when tDRS predicted that the buyer’s bid was likely to be below the floor price. If tDRS predicted that a buyer would be id above the AdX floor for an impression and that floor price was determined by Google’s Reserve Price Optimization program, then Google would apply a 20% revenue share to determine the price floor for the AdX auction but take an additional revenue share to make up for reduced revenue on other impressions.” GOOG-AT-MDL-008842393, at -403 (08/04/2023) (Declaration of Nitish Korula). *See also* GOOG-AT-MDL-009644404, at tab “Sheet1,” row 2 (09/01/2023) (“We would like to launch a new version of DRS to replace existing AdX dynamic revshare. In the new version, the sellside revshare will be determined before collecting bids using ML and will only be applied on reserve prices. By adjusting reserve prices down dynamically we effectively adjust AdX’s profit margin from full margin to low margin to match more queries. The lost profit on these transactions will be recollected from the price gap between RPO price (and optionally buyer’s self min_payment) and the next highest price (we charge buyer RPO price+revshare and pay publisher less than RPO price).”).

⁹⁹² GOOG-DOJ-14162326, at -326 (08/11/2017) (emphasis added).

⁹⁹³ *See* GOOG-AT-MDL-006217592, at -593 (12/12/2022) (Google’s response to European Commission’s RFI 10 states, “[t]he Dynamic Revenue Share feature was discontinued from September 2019, following the launch of the Unified First Price Auction.”).

VII.D.2. Google prevented publishers from setting variable pricing floors, weakening competitive pressures on AdX and impeding publisher's ability to sell impressions through rival exchanges

- (694) Google's Unified Pricing Rules ("UPR"), launched with Google's introduction of the Unified First Price Auction ("UFPA") in 2019, included a restriction that publisher pricing rules "will be applied to all partners equally, and cannot be set for individual buying platforms."⁹⁹⁹ This restriction eliminated the ability of publishers using DFP to set lower reserve prices for rival exchanges than they set for AdX, thereby restricting publishers' ability to work with non-AdX exchanges. In doing so, Google used DFP's substantial market power to directly weaken the competitive pressures faced by AdX in at least two ways.
- (695) First, as I describe, publishers valued the ability to adjust price floors and often set lower floors for rival exchanges than for AdX. This implies that publishers were willing to serve impressions through non-Google ad exchanges even if, for a given impression, AdX would pay more for that impression. This is consistent with publishers deriving non-monetary or quality/service benefits from selling impressions through rival exchanges. Moreover, if rival exchanges obtained more transaction volume, they would likely have improved both in adoption, usage, and hence monetization over time, thereby yielding additional benefits to publishers through increased competition among exchanges.
- (696) Second, publishers' higher floors on AdX imposed more competition on the bids received from AdX. Additionally, because AdX (prior to the change to UFPA) dynamically adjusted its take rates under DRS, higher floors also would tend to put pressure on the fees that AdX could charge.
- (697) Google's variable floor restriction eliminated this ability of publishers to work with rival exchanges via setting variable floors, increasing Google's AdX revenues and impressions, and reducing those of rivals. Similar to how most-favored nation or anti-steering clauses can yield anticompetitive effects in other platform settings,¹⁰⁰⁰ Google's variable floor restriction softened the competitive pressures on AdX to reduce fees, improve quality, or otherwise increase its attractiveness to publishers that floored its exchange higher in order win business that was being captured by rival exchanges.
- (698) Google thus used its dominant position in the publisher ad server market to impede competition in the exchange market, and capture business for AdX not through product innovation or fee reductions, but rather by frustrating the efforts of publishers and rival exchanges to transact with one another.
- (699) In June 2021, Google agreed to relax restrictions on publishers' abilities to set variable pricing floors within DFP with the French Competition Authority.¹⁰⁰¹ This exception is limited to publishers in the

⁹⁹⁹ Jason Bigler, "An update on first price auctions for Google Ad Manager," Google Ad Manager Blog, May 10, 2019, <https://www.blog.google/products/admanager/update-first-price-auctions-google-ad-manager/>.

¹⁰⁰⁰ See Section VI.

¹⁰⁰¹ DOJ-ADS-0000046935, at -935 (06/07/2021); GOOG-AT-MDL-010525710, at -717 (06/21/2022).

E.2. Aggregate take rates among exchanges and ad networks

Figure 110. Summary of worldwide open-web indirect display take rates among ad exchanges

Exchange	Average take rate					Share of impressions (2022)
	Jan. 2018	Jan. 2019	Jan. 2020	Jan. 2021	Jan. 2022	
Google AdX	20%	20%	20%	20%	20%	56%
██████████	12%	14%	15%	16%	18%	6%
██████████	26%	21%	19%	19%	17%	5%
██████████	-	17%	18%	17%	16%	4%
██████████	-	-	9%	8%	8%	4%
██████████	-	9%	20%	18%	17%	3%
██████████	24%	21%	17%	19%	18%	1%
██████████	-	-	-	-	20%	1%
██████████	37%	37%	38%	37%	29%	1%
██████████	-	0%	-	13%	-	-
██████████	20%	20%	20%	20%	-	-
██████████	-	19%	-	-	-	3%
██████████	-	20%	-	-	-	1%

Source: Google AdX data (DOJ RFP 53); Exchange panel (See Appendix H.1.c); ██████████

Notes: The take rates presented in this table are weighted averages in January of each year. I calculate take rates as net revenue divided by gross revenue. Figure 54 in Section V.C.3 presents monthly average take rates in each month from 2018–2022 among a limited set of exchanges that produced data on gross and net revenues. The table above includes all exchanges that produced gross and revenue data, as well as exchanges that produced data in this matter but did not produce data sufficient to calculate take rates (indicated with an asterisk). For those exchanges, the take rates presented above are those represented in the party's produced financial documents. The products in this table do not represent the universe of products in the ad exchanges market but represent the full list of exchanges that produced data in this matter. AdSense Backfill take rates are excluded as they include the take rate for Google Ads as well.

Figure 111. Summary of worldwide open-web indirect display margins among ad networks

Ad network	Inventory source	Average margin					Share of impressions (2019)
		Jan. 2018	Jan. 2019	Jan. 2020	Jan. 2021	Jan. 2022	
Google Ads	AdX	13%	12%	13%	15%	14%	88%
	AdSense	32%	33%	32%	32%	32%	
	3PE	12%	34%	34%	34%	32%	
	Other (Demand Product, unknown)	0%	24%	37%	31%	35%	
██████████		42%	39%	42%	40%	40%	11%
██████████		20%	19%	24%			1%

Source: Google Ads data (DOJ RFP 7); Bidding tools panel (See Appendix H.1.b).

Notes: The take rates presented in this table are weighted averages in January of each year. I calculate margins as net revenue divided by gross revenue. For Google Ads transactions through AdX, I remove the 20% fee taken by AdX from Google's net revenues to isolate fees collected by Google Ads. Google aggregates buy-side and sell-side fees for transactions through AdSense. The table above includes all ad networks that produced gross and net revenue data. ██████████ exited the open-web display market in mid-2020 and exits the data after June 2021.

E.3. Google Ads margins

Figure 112. Google Ads margin by exchange

Average Google Ads margin	2018	2019	2020	2021	2022
Impressions won through AdX	13.4%	12.7%	13.1%	13.8%	12.1%
Impressions won through third-party exchanges	18.5%	34.1%	34.1%	32.9%	32.5%
Impressions won through third-party exchanges (according to EC submission)	18.5%	34.2%	34.1%	32.9%	32.5%

Source: Google Ads data (DOJ RFP 7), DRX Internal Stats data (DOJ RFP 57), Google EC submissions (GOOG-AT-MDL-006218271).

Notes: Limited to open-web display transactions through open auction. Excludes video ads and impressions on Google O&O properties. The "Impressions won through AdX" row excludes outliers (transactions with CPMs greater than \$100). The DRX Internal Stats data is used in the "Impressions won through AdX" row because this dataset is used to compute margin dispersion in Figure 114 and Figure.

Figure 113. Google Ads margin sensitivities (transactions through AdX)

Google Ads margin	2018	2019	2020	2021	2022
Open-web display	13.4%	12.7%	13.1%	13.8%	12.1%
Include observations with CPMs > \$100	13.5%	12.7%	13.2%	14.2%	12.5%
Include mobile app and all ad types	13.8%	15.4%	15.3%	15.5%	14.5%
Include mobile app, all ad types, and observations with CPMs > \$100	13.8%	15.4%	15.4%	15.8%	14.8%

Source: DRX Internal Stats data (DOJ RFP 57).

Notes: Limited to impressions purchased by Google Ads through AdX open auction. All sensitivities exclude Google O&O properties. The "Open-web display" row excludes outliers (transactions with CPMs greater than \$100), while the subsequent row includes these outliers. The "Include mobile app and all ad types" row excludes outliers but includes mobile app advertisements, instream video ads, and video game ads. The final row includes outliers, mobile app advertisements, instream video ads, and video game ads. The DRX Internal Stats data is used in this table because this dataset is used to compute margin dispersion in Figure 114 and Figure 115.

- OpenX¹³⁰¹
- PubMatic¹³⁰²
- Sharethrough¹³⁰³
- Sovrn¹³⁰⁴
- Verizon¹³⁰⁵
- Xandr¹³⁰⁶
- YieldMo¹³⁰⁷
- Zedo¹³⁰⁸

(6) I also received data from the following third-party exchanges, but I do not include them in my analyses because they offer products that are either in-app or video only, and thus are not included in the product markets I've defined.

- Fyber
- IronSource
- Unity
- Vungle

H.2. Additional limitations

(7) Where possible, I exclude transactions that are sold through a publisher's owned and operated ad tech products from Google and third-party datasets before incorporating them into analyses.¹³⁰⁹

¹³⁰¹ OPENX-AGG-LIT-00000001.002

¹³⁰² PMDATA0001

¹³⁰³ SHARE002363

¹³⁰⁴ DoJ Civil Action Data Request Responses, sheets "Q10_US_inventory type " and "Non-Us_inventory_type"

¹³⁰⁵ YAH_GG_LIT_005629_BRDX Data Pull - 2018 – 2023; YAH_GG_LIT_005630_DSP+ Data Pull - 2018 to YAH_GG_LIT_005635_DSP+ Data Pull - 2023

¹³⁰⁶ MSFT-LIT-0000060007; Request3_202205

¹³⁰⁷ WSGR_data_pull_2018 to WSGR_data_pull_2023

¹³⁰⁸ Zedo Adserver and Exchanges Revenue form July 2012

¹³⁰⁹ Publishers who sell their ad inventory through their owned and operated ad tech products include Google, Verizon (including Yahoo and AOL), Xandr (Microsoft), FAN, and Amazon. I exclude all transactions involving these publishers selling inventory through their owned and operated ad tech products from the ad exchange and bidding tools markets.

- (8) Where possible, I limit Google and third-party datasets to indirect, open-web, display transactions before incorporating them into analyses.¹³¹⁰
- “Indirect” excludes direct deals. It includes open auction, private auction, header bidding, and first look transaction types. For the purpose of calculating market shares, I include private marketplace (PMP) transactions as indirect transactions.¹³¹¹
 - “Open-web” excludes in-app transactions.
 - “Display” includes transactions with display and outstream video ad types.
 - I include transactions through desktops and mobile devices. I exclude transactions through other devices, such as connected TV.

H.3. Market size calculations

H.3.a. Setup

- (9) To explain the calculation of market sizes used for computing market shares, I define three groups of exchanges (where the identity of products in each group differ by month, depending on data availability):
1. Exchanges that produced data that identify the bidding tool source (E1)
 2. Exchanges that produced data that do not identify the bidding tool source (E2)
 3. Exchanges that did not produce data (all other exchanges, E3)
- (10) Likewise, there are three groups of bidding tools:
4. Bidding tools that produced data that identify the ad exchange (B1)
 5. Bidding tools that produced data that do not identify the ad exchange (B2)
 6. Bidding tools that did not produce data (all other bidding tools, B3)
- (11) Note that some third-party exchanges and bidding tools produced only impressions or revenue data, so these categories are defined separately for impressions and net revenue calculations. The four figures below summarize the availability of data I have received from third-party exchanges and

¹³¹⁰ When transaction type, channel, ad type, or device variables are missing or unknown, I assume they are in-market and include them in my analyses unless otherwise noted.

¹³¹¹ According to Google, PMP is a term used to refer to both Private Auction and Preferred Deals. GOOG-AT-MDL-008544607.

- (50) However, a January 2016 Google “launch” document described its goal for “allow[ing] non-AdX exchanges to compete with realtime pricing from within DFP” is “to provide slightly better value for publishers than header bidding but not so much that it completely cannibalizes AdX.”¹⁴²⁹
- (51) Consistent with this, Exchange Bidding had two features that reduced its attractiveness. First, Google charged a 5% or 10 % fee to third-party exchanges for participating in Exchange Bidding (See Sections II.E.4, VII.D.1). According to a Google document, an Exchange Bidding fee discouraged buyers from switching away from AdX as the fee was an extra cost added to the fee charged by those third-party exchanges.¹⁴³⁰ Second, Google did not allow DSPs to participate in Exchange Bidding directly, or allow ad exchanges to bid in with demand from their own DSPs, which an internal Google document noted was to prevent DSPs from circumventing AdX and its revenue share.¹⁴³¹
- (52) Nonetheless, despite these features, in Section VII.A.2, I described why the introduction of Exchange Bidding is an example of greater (perceived) competition spurring Google to innovate.

L.3.b. Adjustments to DV360’s bidding strategies

- (53) A Google internal email exchange in November 2016 indicates that there was strong interest to “look at buy side initiatives to increase Google’s overall competitiveness” as a means to “reduce the competitiveness of SSP header tags.” The document further notes that “[if] DBM/GDN could buy more intelligently” it could “reduce the volume of header bidding impressions won by 3rd party exchanges.”¹⁴³² Another email exchange in November 2016 stated that “the most urgent step to take is make our buying approach even more intelligent for GDN, Awbid and DBM... Only buy on AdX impressions that are exposed through AdX and multiple SSP (ie, dry out HB SSP).”¹⁴³³
- (54) Google employees considered ways to “buy more intelligently” and to “dry out” header bidding. The list of possibilities included preventing DV360 advertisers from buying from publishers suspected of

publishers and exchanges have very strongly complained about the fairness of it. This was one of the biggest objections raised... If we want exchanges to give up HB and move to EB, we need to give [sic] some concessions. 2) Because we aren’t actually losing much money by giving it up. Furthermore, reclaiming what money we lose is completely under our control through more aggressive RPO tactics... 3) It creates a clear differentiation between EB and HB -- exchanges that go through HB are subject to last look, and those that go through EB are not. This gives a pretty big incentive to switch.”); GOOG-TEX-00120929 at -930 (10/13/2016).

¹⁴²⁹ GOOG-TEX-00117939 at -939 (01/06/2016).

¹⁴³⁰ An undated Google internal presentation discusses the risks associated with different EB fees. The presentation notes that fees of 3% or lower would result in “Huge risk to AdX revenue” as “Buyers flee AdX.” GOOG-TEX-00082594 at -611 (07/30/2015).

¹⁴³¹ GOOG-TEX-00103579 at -579 (07/12/2016). (Exchange Bidding is “not designed to be a way for a current DSP to circumvent AdX contract to get a cheaper revenue share.”). See also Section II.E.4.

¹⁴³² GOOG-DOJ-12713374, at -374 (11/02/2016).

¹⁴³³ GOOG-DOJ-05314741 at -741 (11/22/2016).

using header bidding through other exchanges¹⁴³⁴ and developing a “whitelist for non-HB queries” and restricting DV360 bids to those impressions.¹⁴³⁵

- (55) Notes from a November 2016 meeting discussing results of experimenting with withholding DBM bids from publishers using header bidding suggest another way to combat the threat of header bidding while minimizing losses to Google: “instead of stop bidding on HB [header bidding] queries, we could bid lower on HB queries.”¹⁴³⁶
- (56) In a 2018 email, an executive states “We already flagged concerns w/ HB back in 2016. The discussion back then led to some sensible changes in EB, the inception of Demand Product [Ad Connector] as well as multiple initiatives in DBM to combat the effects of header bidding, such as first price auction protection [Poirot] (all HB is by definition first price). The combined impact of these were to shift ~500M spend inventory.”¹⁴³⁷
- (57) According to this email, Google’s collective responses to header bidding shifted a significant amount of ad spending. I discussed Demand Product above in Section K.3. Below, I provide background for Project Poirot, which I discussed in Section V.C.1.
- (58) **Project Poirot.** Google introduced the first version of Project Poirot in July 2017 as “Optimized Fixed CPM Bidding”¹⁴³⁸ to address the possibility that third-party ad exchanges were claiming to run second-price auctions but in fact were running non-second-price auctions, such as first-price auctions or auction variants that employed so-called “soft floors.”¹⁴³⁹ Project Poirot launched an “algorithmic framework to detect and quantify deviations from second price auctions using DBM [DV360] data” and used this framework as an input to optimize bids in order to win the same impressions at lowest price.”¹⁴⁴⁰
- (59) Google documents indicate that one goal for Project Poirot was to increase advertiser surplus by “shading” advertiser bids on third-party exchanges that did not run second price auctions. An April 2017 Google slide deck states, “The goal of Poirot is to discover the exchanges that deviate from second pricing and bid appropriately on these to improve advertiser performance on these

¹⁴³⁴ GOOG-TEX-00094226 at -227, (11/10/2016).

¹⁴³⁵ GOOG-TEX-00104467 at -467, (10/28/2016).

¹⁴³⁶ GOOG-TEX-00094226 at -227, (11/10/2016).

¹⁴³⁷ GOOG-DOJ-09429825, at -825. (03/16/2018) (Tobias Maurer, emphasis in original). Within the email chain, Google Executive Payam Shodjai notes, “The problem isn’t so much that DBM is buying HB inventory -- the problem is that HB exists :). . . Since DBM is the largest buyer on many exchanges, we are also the largest buyer of HB inventory, because there’s is no way for us to discriminate HB vs non-HB inventory. So for DBM to stop buying HB inventory would mean DBM stops buying on third-party exchanges. This is something we can certainly discuss.” (at -825 - 826).

¹⁴³⁸ GOOG-DOJ-08129106 at -106, (06/15/2017) (calling Poirot “Optimized Fixed CPM Bidding” and noting that it will be launched gradually, with full launch in four weeks).

¹⁴³⁹ GOOG-DOJ-05282625, at -631–645 (10/04/2018). *See also* Section III.E for a discussion of auction concepts, including first-price and second-price auctions and soft floors.

¹⁴⁴⁰ GOOG-DOJ-05282625, at -636–637 (10/04/2018).

exchanges.”¹⁴⁴¹ Consistent with the discussion in Section III.E, the document explains why optimal bidding strategies differ between second-price and non-second-price auctions.¹⁴⁴²

- (60) According to Google documents, Poirot estimated a “bidding policy function” that maps information about the auction to an optimal bid that maximizes an objective defined by $\sum_i (v - c_i)$, where v is the value the bidder places on the impression and c_i is the cost of each impression.¹⁴⁴³ Google specified the optimal bidding policy as a bid shading factor α (which varies between 0 and 1) multiplied by the initial DV360 bids; thus α determines the fraction by which Google reduces bids from DV360 to rival exchanges. Prior to the launch of UFPA in 2019, Google did not reduce bids from DV360 to AdX.¹⁴⁴⁴
- (61) In a June 2018 email Google’s Nirmal Jayaram, at the time a Senior Staff Data Scientist in the Display Ads unit, summarized the expected impact of Poirot on DV360’s bids as “[b]ecause of launches like Poirot we expect bids on 3PE to be lower than on AdX.”¹⁴⁴⁵
- (62) Google developed a second version of Poirot in mid-late 2018.¹⁴⁴⁶ The new version modified the original Poirot algorithm to 1) include an auction type reported by exchanges; 2) lower the floor of the bid shading factor α from 0.6 to 0.1; 3) change the functional form of the algorithm; and 4) remove customer_id from consideration.¹⁴⁴⁷
- (63) According to an August 2018 launch document, results from an experiment indicated that the second version of Poirot reduced DV360 advertiser spend on rival ad exchanges by 19.7%, payout by - 20.1%, and lowered rival ad exchanges’ win rates by 10%.¹⁴⁴⁸ Google also analyzed the impact of the second version of Poirot on individual exchanges, and found that it would reduce DV360 revenue on AppNexus/Xandr by 31.4%, by 22.3% on Rubicon, and by 42.0% on OpenX.¹⁴⁴⁹ According to the

¹⁴⁴¹ GOOG-DOJ-10806862, at -862 last modified (04/25/2017).

¹⁴⁴² GOOG-DOJ-10806862, at -864 last modified (04/25/2017) (“Given a second price auction, the optimal strategy for an advertiser who has a value v for an impression is to bid $b=v$. In a non second-price auction, the price the advertiser pays depends on its bid, which means that the optimal strategy may be to bid $b^*<v$. In particular, the optimal strategy would be to bid the lowest amount at which the advertiser still wins the impression (assuming that this amount is less than the advertiser’s value; otherwise the advertiser would prefer not to win.”).

¹⁴⁴³ GOOG-DOJ-05282625, at -636 (11/27/2017), Nov. 27, 2017 (“Bidding in adversarial auctions” presentation describing that Poirot has “two key components: 1. Algorithmic framework to detect and quantify deviations from second price auctions . . . [and] 2. Bidding mechanism to optimize bids based on the input from framework in 1”); *id.* at -642; GOOG-DOJ-10806862, at -865–67 (04/25/2017), Apr. 25, 2017 (Poirot Design Document).

¹⁴⁴⁴ GOOG-AT-MDL-008842383, at -391 (08/05/2023) (Jayaram Declaration, ¶ 33) (“Before Google transitioned to a Unified First Price Auction, Poirot determined that reducing bids into AdX did not increase expected advertiser surplus by more than the 10-percent threshold, so Poirot did not lower DV360 bids into AdX”).

¹⁴⁴⁵ GOOG-DOJ-14458165, (06/20/2018), June 20, 2018; Deposition of Nirmal Jayaram (Google), November 14, 2023 10:4-11:14.

¹⁴⁴⁶ GOOG-DOJ-15743853, at -853 (09/06/2018).

¹⁴⁴⁷ GOOG-DOJ-12059682, at -682-6, (08/10/2018).

¹⁴⁴⁸ GOOG-DOJ-12059682, at -683-684, (08/10/2018).

¹⁴⁴⁹ GOOG-DOJ-12059682, at -683–684 (08/10/2018).

experiment, the second version of Poirot increased revenue, publisher payouts, and win rates on AdX.¹⁴⁵⁰

- (64) A 2018 Google presentation stated that Poirot resulted in “significantly reducing monetization through 3PE and increasing DBM spend on Adx and other clean exchanges.”¹⁴⁵¹ A slide from that presentation reports that Poirot reduced advertiser spend through DBM on Pubmatic by 40%, on OpenX by 35% and on Rubicon by 15%.¹⁴⁵²
- (65) Other Google documents also explain that Project Poirot reduced DV360’s spending on many rival ad exchanges. For example, in a March 2018 email Google’s Payam Shodjai wrote that “Poirot has actually been quite effective, resulting in [DV360] spending 7% more on AdX and reducing spend on most other ad exchanges.”¹⁴⁵³ In a September 2019 email, Google’s Ali Nasiri Amini, at the time a Distinguished Scientist within the ads engineering organization, wrote “Poirot reduced spend on most of 3P by 15%.”¹⁴⁵⁴
- (66) Other documents show that at least three third-party exchanges (Oath,¹⁴⁵⁵ OpenX,¹⁴⁵⁶ and TrustX¹⁴⁵⁷) asked Google about a decline in DV360 expenditures on their platform in late 2018.¹⁴⁵⁸ In those cases, Google employees attributed the decline to Project Poirot or supply path optimization (SPO) programs more generally.¹⁴⁵⁹

¹⁴⁵⁰ GOOG-DOJ-12059682, at -683 (08/10/2018).

¹⁴⁵¹ GOOG-DOJ-10733927, at -946 (07/13/2018).

¹⁴⁵² GOOG-DOJ-10733927, at -947 (07/13/2018).

¹⁴⁵³ GOOG-TEX-00085512 (03/16/2018).

¹⁴⁵⁴ GOOG-AT-MDL-001427607 at -607, (09/05/2019); Deposition of Ali Amini (Google), November 14, 2023 at 39:17–19, 70:11–13, 76:5–11.

¹⁴⁵⁵ GOOG-DOJ-13602970, at -973 (11/05/2018).

¹⁴⁵⁶ GOOG-DOJ-07832462, at -464 (12/01/2018).

¹⁴⁵⁷ GOOG-DOJ-13603005, at -007 (11/29/2018).

¹⁴⁵⁸ Google employee Sam Temes noted the peculiar timing of these inquiries, stating in an email, “3rd exchnage [*sic*] in 3 weeks to complain about us spending less. Is this due to behind the scenes SPO [supply path optimization] we are implementing?” (see GOOG-DOJ-13603005, at -006–007 (11/29/2018)).

¹⁴⁵⁹ In the case of Oath, Google employee Ayodele Marcus wrote an email to Oath stating that “The spend impact/trend is most likely explained by bidding optimization launches that protect buyers from overpaying for inventory by controlling for various auction dynamics. The bidding algorithm improvements will lower the bid to an optimal value when the auction is not second price” (see GOOG-DOJ-13602970, at -970 (12/06/2018)). In the case of OpenX, Google employee Roshan Khan wrote in an email, “Poirot is the biggest culprit. You could say we are just getting smarter with our bidding and providing more value to our advertisers. However, we know there are some issues specifically with OpenX and the way they send us first price vs second price auctions – we treat them all the same instead of doing a different Poirot model for FirstPrice vs SecondPrice. We also made Poirot more aggressive recently allowing it to reduce a bid by up to 90%, and enabling it on even Algo based line items, which caused OpenX spend in Nov to drop 30% YoY. You could consider this the new normal as well – if we maintain our commitment to be a more aggressive performance seeking bidder. Short story I think is to say that we don’t see a path in which we spend more with OpenX in the near term, but we aren’t explicitly penalizing them – we are just becoming smarter about the way we bid and the industry is penalizing 3PE in general.” (See GOOG-DOJ-07832462, at -462 (12/03/2018)). In the case of TrustX, Google employee Nirmal Jayaram wrote in an email, “The timing aligns with us improving our Poirot algorithms” (see GOOG-DOJ-13603005, at -006).

- (67) The effects of Project Poirot described above are consistent with DV360’s ability to impact the attractiveness of AdX relative to other ad exchanges through adjustments to its bidding behavior, and hence ability to contribute to AdX’s market power (as described in Section V.C.1.).

L.4. Google’s Dynamic Revenue Sharing Programs for Google Ads

- (68) In this Section I describe Google’s dynamic revenue sharing program for Google Ads, and its subsequent versions referred to as Project Bernanke and Project Bell.¹⁴⁶⁰ I explain that Google is able to engage in substantial price discrimination with its Google Ads advertiser ad network product by varying Google Ads’ average targeted margin both across publishers, and within publishers across impressions; and that by increasing Google Ads’ targeted margin for certain publishers (thereby reducing payouts publishers would receive when Google Ads’ bid for those publishers’ inventory), Google could affect publishers’ usage of AdX within their publisher ad servers.
- (69) These programs are referenced when I discuss Google Ads’ substantial and persistent market power (see Section V.D.3), and when I explain how Google meaningfully harmed rivals’ competitiveness by foreclosing rival ad exchanges from unrestricted access to Google Ads demand (see Section VII.B, VII.F.1).

L.4.a. Google Ads Dynamic Revenue Share and Project Bernanke

- (70) Google Ads Dynamic Revenue Share (“Google Ads DRS”) and Project Bernanke were programs that allowed Google to dynamically adjust the margin that Google Ads targeted on impressions won through AdX in order to win more impressions and increase its profits.
- (71) Prior to the Uniform First Price Auction introduced in 2019, Google Ads (AdWords at the time) submitted two bids into the AdX auction.¹⁴⁶¹ Google documents indicated that this was “to prop up publisher payout” in AdX’s second-price auction.¹⁴⁶² A 2013 Google document noted two issues at the time: first, approximately half of AdX queries were unmatched due to publisher floors being

¹⁴⁶⁰ Around September 2019, Google Ads adapted its bidding algorithm to account for AdX’s transition from second-price to first-price auctions. This new algorithm, “Project Alchemist,” no longer submitted two bids when targeting an average take rate. *See* GOOG-AT-MDL-006218271, at -284 and -286 (01/06/2023) (“Google updated the Bernanke algorithms in 2019 to be compatible with the Unified First-Price Auction... The updated version of Bernanke is sometimes referred to within Google as ‘Alchemist’”, “The update was designed to enable Google Ads to bid into the Unified First-Price Auction, while continuing to target a similar aggregate take rate.”), *See also*, GOOG-AT-MDL-009953982 (03/18/2018) and GOOG-DOJ-AT-00292252 (10/10/2019).

¹⁴⁶¹ *See* GOOG-AT-MDL-006218271, at -286 (01/06/2023) (Google’s Jan 6, 2023 response to European Commission’s RFI 10).

¹⁴⁶² GOOG-DOJ-10733927, at -933 (07/13/2018). Before 2019, AdX ran a second-price auction where the winning bidder pays the maximum of the second-highest bid or the reserve (or floor) price. By submitting a second bid from Ads, Google would increase the payment to the publisher in the event AdX served the ad, and both the highest and second-highest bids into AdX were from Ads.

- (76) As one Google document described, “Project Bernanke works by manipulating Google’s revshare to clear higher floor prices.”¹⁴⁷¹ According to a Google presentation, Project Bernanke “[a]dded almost 20% revenue on Adwords * Adx.”¹⁴⁷²
- (77) A 2013 Google document indicates that that Bernanke would allow Google Ads to increase its bid “as high as 4x the CAT2 price,” where the price would determine the most the advertiser would pay.¹⁴⁷³ The document explained, “Why would we want to bid higher than b1 [the first place eCPM of the CAT2 auction]?... By bidding higher than b1, we can now win these auctions. We still charge the advertiser b1 and pay more than b1 to the exchange. In these situations, our margin is <0%.”¹⁴⁷⁴ In other words, Bernanke would allow for a negative margin on certain auctions.
- (78) The document also noted that “Bernanke can displace some spend from other AdX buyers.”¹⁴⁷⁵

L.4.b. Global Bernanke and Project Bell

- (79) Project Bernanke evolved into different versions, referred to as both Project Bell and Global Bernanke.

¹⁴⁷¹ GOOG-AT-MDL-001397473, at 482 (09/05/2017).

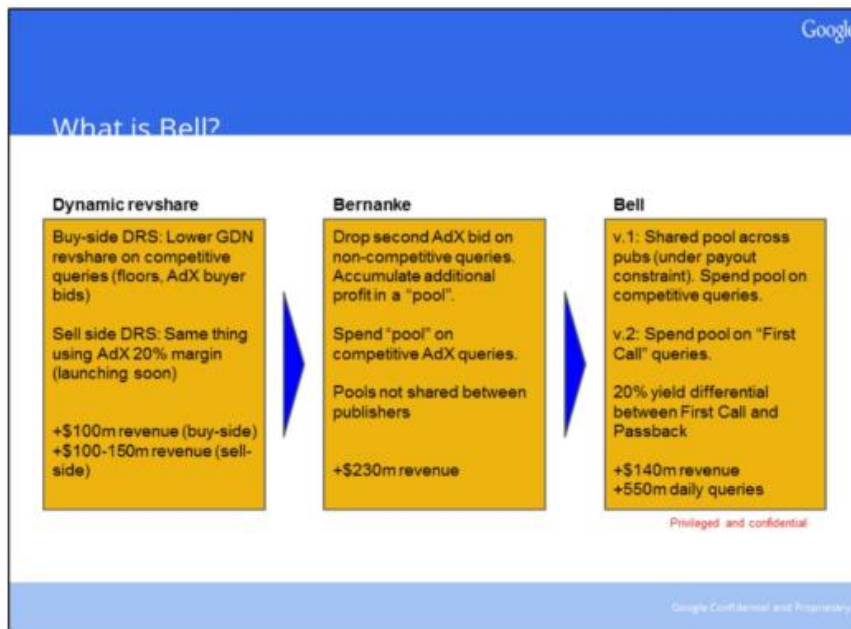
¹⁴⁷² GOOG-DOJ-10733927, at -960 (07/13/2018).

¹⁴⁷³ See GOOG-AT-MDL-006218257, at -265 (12/16/2023) (Google’s Dec 16, 2023 response to European Commission’s RFI 10), (“Content Ads Targeting v2 (‘Cat2’) and GMob are different parts of Google’s ad serving infrastructure. Cat2 is the part of Google’s ad serving infrastructure that determines most of the web and app ad candidates that Google Display Ads and DV360 will submit into the Ad Manager, AdSense and AdMob auctions.”).

¹⁴⁷⁴ GOOG-AT-MDL-001283154, at -156 (12/11/2013).

¹⁴⁷⁵ GOOG-AT-MDL-001283154, at -156 (12/11/2013).

Figure 156. What is Bell?



Source: GOOG-DOJ-03901693, at -701 (11/2014).

- (80) Figure 156 depicts a slide from a November 2014 presentation describing Project Bell. The first version of Project Bell, also referred to as Global Bernanke,¹⁴⁷⁶ launched in May 2015¹⁴⁷⁷ and adapted Project Bernanke so that the average Google Ads margin could vary by publisher: that is, as opposed to constraining margins to be the same (15%) for each publisher as in the original Project Bernanke, Google targeted a 15% margin across "AdX as a whole," allowing Ads margins levied on certain publishers to be higher than for others.¹⁴⁷⁸ In this first version of Project Bell, Google would build a "pool" of collected fees that might exceed its standard 15% margin by lowering Google Ads' second bid for "non-competitive pubs," and spend this pool on "competitive queries / publishers."¹⁴⁷⁹ The

¹⁴⁷⁶ GOOG-DOJ-27803533, at -552 (03/4/2015); See also GOOG-AT-MDL-006218271, at -284, (01/06/2023) (Google's Jan 6, 2023 response to European Commission's RFI 10).

¹⁴⁷⁷ GOOG-DOJ-06595722 (05/21/2015) (Global Bernanke launch document), GOOG-AT-MDL-006218271, at -284 (01/06/2023) (Google's Jan 6, 2023 response to European Commission's RFI 10).

¹⁴⁷⁸ GOOG-DOJ-AT-02471194, at -194 (07/26/2015) ("Global Bernanke is an extension of project Bernanke in which GDN retains a 15% margin on AdX as a whole, while deviating from 15% on individual publishers... Competitive publishers where we have opportunities to win new queries over reserves or competition and publishers where incremental conversions come at a high conversion rate (conversion / queries) both are likely to see lower margins. Future versions of Global Bernanke will see deviations from 15% not just on individual publishers but also on specific important slices (E.g., mediated queries that we don't see first might have margins > 15%, conversely first look deals might have margins < 15%).").

¹⁴⁷⁹ GOOG-DOJ-03901693, at 702 (11/2014).

first version imposed the constraint that no publisher would lose more than 10% from its payout under Bernanke.¹⁴⁸⁰

- (81) The first version of Project Bell thus provided Google with the ability to adjust Google Ads' margins across publishers, so that some publishers would receive lower payouts from AdX when Google Ads won (by charging a higher Google Ads margin), and other publishers would receive higher payouts, subject to a payout constraint.
- (82) According to a declaration from Nirmal Jayaram, Senior Director of Engineering at Google, a modified version of Global Bernanke, "referred to internally as 'Bell v.2.'," launched in October 2016 that focused on "the detection and management of multiple calls".¹⁴⁸¹

Bell v.2 changed Google Ads' bidding behavior only for the publishers that were understood, based on internal experiments, to be calling AdX multiple times for the same potential ad opportunity ("multi-calling publishers")... Bell v.2 changed Google Ads' bidding behavior for multi-calling publisher as follows: (1) Google Ads disabled Bernanke when bidding on multi-calling publishers' inventory, (2) Google Ads set a limit on how high it would bid based on its bids from the prior week and also an absolute cap on how high it would bid, and (3) Google Ads would not buy inventory from multi-calling publishers via third-party exchanges. [...]

To encourage them to reduce usage of multi-calls, Google communicated with multi-call publishers that Google Ads would be making some changes to how it submitted bids in response to multi-calling.

- (83) Consistent with Google altering Ads' bidding behavior to change publishers' behavior, in an email chain beginning in February 2017, Google executive Bryan Rowley wrote about a publisher, "they should realize that AdX is still the only source to get access to all of GDNs demand. If they chose another monetization partner they loose [sic] access to all of GDN," and another employee responded, "this partner is a bit reluctant, but seems we are on a good way to get them to stop mediating."¹⁴⁸² Later in the same chain, in April 2017, Mr. Jayaram wrote that "wp.pl was one of the biggest

¹⁴⁸⁰ GOOG-DOJ-AT-02471194, AT -194 (07/26/2015) GOOG-DOJ-03901693, at -702 (11/2014).

¹⁴⁸¹ GOOG-AT-MDL-008842383, at -386–387 (08/05/2023) (Declaration of Nirmal Jayaram, August 5, 2023, "Global Bernanke was subsequently updated in October 2016. This update, relating to the detection and management of multiple calls, was sometimes referred to internally as 'Bell v.2.' Under Bell v.2, Google Ads would modify its bidding behavior (to decrease bid variance) when receiving multiple calls for the same ad request to protect advertisers from the risk of price inflation. A 'call' refers to a publisher's request that an ad exchange supply an ad to show in response to a specific ad opportunity when a user has navigated to the publisher's property. Some publishers would call an ad exchange, such as AdX, multiple times for the same potential ad opportunity.").

¹⁴⁸² GOOG-DOJ-15443001, at -002 (02/20/2017).

mediating domains. They just stopped mediating and dropped out of our list (and the pub indicated that their adwords spend has gone back up).”¹⁴⁸³

- (84) The above discussion shows Google Ads’ ability to influence the actions of publishers through adjustments to its bidding behavior, and that Google Ads possesses substantial market power. If Google Ads did not possess substantial market power, its ability to affect publishers’ behavior by adjusting its margins would have been more constrained by customer substitution to competitive alternatives.

¹⁴⁸³ GOOG-DOJ-15443001 (04/26/2017). See also GOOG-DOJ-09475820, at -874 (03/2017) (“GDN is going to start making changes to its buying algorithm... passbacks (backill [sic] in other SSPs) will be ‘punished’”).

Appendix M. Glossary

Term/abbreviation	Definition
Authorized Buyers	Authorized Buyers are bidding tools authorized to purchase inventory and participate in real-time bidding on AdX. ¹⁴⁸⁴
Ad exchanges	Software products that run real-time auctions for publishers' display ad inventory among advertisers. ¹⁴⁸⁵
AdMob	A publisher-facing Google product that facilitates the sale of in-app advertising but does not offer web display advertising. Google describes AdMob as a product that "serves both as a publisher-facing component of Google's ad network and a platform for mobile app publishers offering mediation services for publishers wishing to find buyers for their inventory from multiple different ad networks." ¹⁴⁸⁶
Advertiser ad networks	Software products that advertisers use to purchase display ad inventory from publishers. ¹⁴⁸⁷
AdSense	AdSense is the web publisher-facing component of Google's display ad network. ¹⁴⁸⁸
AdSense for Content ("AFC")	A Google product that provides "a self-service platform for Web publishers that do not have direct sales to monetize their content. AFC focuses on automation and offers limited controls to publishers." ¹⁴⁸⁹
AdSense for Search ("AFS")	A Google product that allows publishers to monetize search results by serving ads within the publisher's own search features. ¹⁴⁹⁰
Google Ads	Google's advertiser ad network, formerly known as Adwords. With respect to display advertising, Google defines Google Ads as its "advertiser-facing component of Google's ad network, which advertisers can use to set up media campaigns to show digital ads on Google-owned inventory and third-party partner websites." ¹⁴⁹¹
AdX	Google's ad exchange.
AdX Direct	A limited way for third-party publisher ad servers to obtain access to AdX demand. ¹⁴⁹²
APAC	Asia-Pacific
AWBid	A Google program that allowed AdWords buyers to access retargeting impressions from non-Google publishers and exchanges such as AdMeld, PubMatic, and Rubicon. ¹⁴⁹³
Alchemist (Bernanke for first-price auctions)	2019 adaption to the Google Ads bidding algorithm to no longer submit two bids when targeting an average take rate, accounting for AdX's transition from second-price to first-price auctions. ¹⁴⁹⁴
CAT2	"[T]he part of Google's ad serving infrastructure that determines most of the web and app ad candidates that Google Display Ads and DV360 will submit into the Ad Manager, AdSense and AdMob auctions." ¹⁴⁹⁵

¹⁴⁸⁴ Google, "Authorized Buyers overview," Authorized Buyers Help, <https://support.google.com/authorizedbuyers/answer/6138000?hl=en>.

¹⁴⁸⁵ Section II.B.3. (Ad exchanges).

¹⁴⁸⁶ GOOG-AT-MDL-006218257, at -260 (12/16/2022); Section II.C.5.c. (AdMob).

¹⁴⁸⁷ Section II.B.2.b. (Advertiser ad networks).

¹⁴⁸⁸ Section II.C.3.b. (AdSense).

¹⁴⁸⁹ Section II.C.3.b. (AdSense).

¹⁴⁹⁰ Section II.C.3.b. (AdSense).

¹⁴⁹¹ GOOG-AT-MDL-006218257, at -260 (12/16/2022); Section II.C.3.a. (Google Ads).

¹⁴⁹² Section VII.C.3.

¹⁴⁹³ Section V.C.1.

¹⁴⁹⁴ Appendix L.4.a.

¹⁴⁹⁵ Appendix L.4.a; GOOG-AT-MDL-006218257, at -265 (12/16/2022).

Content recommendation ads	A form of native advertising that appears as a collection of links that suggest additional external content for users. Publishers tend to place these ad units at the bottom of their pages. ¹⁴⁹⁶
Conversions	A conversion occurs “when someone interacts with your ad or free product listing (for example, clicks a text ad or views a video ad) and then takes an action that you’ve defined as valuable to your business, such as an online purchase or a call to your business from a mobile phone.” ¹⁴⁹⁷
Constellation	Project that enables Google to create “groups of DoubleClick IDs that are considered to come from the same device or user.” ¹⁴⁹⁸
Cookie	A piece of text that is sent from a website that a user visits to their browser which allow websites to track information about the user, their behavior across websites, and can help to identify unique users across browsing sessions. ¹⁴⁹⁹
CPA	Cost per action
CPC	Cost per click
CPM	Cost per thousand impressions
CPMAV	Cost per mille active view
CPM Bidding	Bidding on a CPM basis
CTR	Click-through rate
DA	Dynamic allocation
DART	Predecessor of DFP. ¹⁵⁰⁰
DBM	DV360, formerly DoubleClick Bid Manager (“DBM”), is Google’s DSP
DFP First Look (“DFL”)	A Google product that publishers can use to sell inventory ahead of its guaranteed inventory. ¹⁵⁰¹
DoubleClick for Publishers (“DFP”)	Google’s publisher ad server. DFP is used by publishers to manage, sell, and serve display ads. ¹⁵⁰²
Display ads / banner ads	Image or text-based advertisements that internet users see online. Display (banner) ads may include items such as text, images, video, audio, and often come in a set of predetermined formats and sizes. ¹⁵⁰³
Data management platforms (“DMP”)	Products used to assist in the development of advertising content and managing data. ¹⁵⁰⁴
Direct transactions	Transactions that are subject to terms individually and “directly” negotiated between publishers and advertisers. ¹⁵⁰⁵
Dynamic remarketing	Remarketing allows you to show ads to people who have previously visited your website or used your mobile app. Dynamic remarketing lets you show previous visitors ads that contain products and services they viewed on your site. ¹⁵⁰⁶
Dynamic revenue sharing (“DRS”)	A Google policy used to vary the revenue share percentage across transactions, while maintaining a certain average revenue share. ¹⁵⁰⁷

¹⁴⁹⁶ Section II.A.

¹⁴⁹⁷ Google, “Conversion: Definition,” Google Ads Help, accessed December 21, 2023, <https://support.google.com/google-ads/answer/6365?hl=en>.

¹⁴⁹⁸ GOOG-AT-MDL-006218257–300, at -300 (01/06/2023) (Google’s Jan. 6, 2023 response to European Commission’s RFI 10).

¹⁴⁹⁹ Section II.A.3 (Audience targeting).

¹⁵⁰⁰ Google, “The next generation of ad serving for online publishers,” Google Official Blog, February 22, 2010, <https://googleblog.blogspot.com/2010/02/next-generation-of-ad-serving-for.html>.

¹⁵⁰¹ Appendix K.2

¹⁵⁰² Section II.C.1.

¹⁵⁰³ Section II.A.

¹⁵⁰⁴ Section II.B.

¹⁵⁰⁵ Section II.A.4.

¹⁵⁰⁶ Google, “Dynamic Remarketing”, Tags, accessed December 21, 2023, <https://developers.google.com/tag-platform/devguides/dynamic-remarketing#:~:text=Remarketing%20allows%20you%20to%20show,they%20viewed%20on%20your%20site>

¹⁵⁰⁷ Section II.D.

DRX (DoubleClick Reservations and Exchange)	Google's internal name for the team working on AdX + DFP products (within GAM). ¹⁵⁰⁸
Demand side platform ("DSP")	Products that allow advertisers to manage and submit real-time bids for display inventory through ad exchanges. ¹⁵⁰⁹
Display & Video 360 ("DV360")	Google's advertiser-facing DSP, formerly known as DoubleClick Bid Manager (DBM). ¹⁵¹⁰
DVAA	"Display Ads, Video Ads, Apps Ads, and Analytics." ¹⁵¹¹
Open Bidding ("OB")	Formerly known as Exchange Bidding ("EB"), a functionality within DFP that allows third-party exchanges to compete with real-time bids against AdX and deals that were subject to Dynamic Allocation without being relegated to the waterfall. Industry participants as well as Google described Exchange Bidding as server-side header bidding administered by Google. ¹⁵¹²
Enhanced Dynamic Allocation ("EDA")	A Google program that allows AdX to bid against direct deals, including those with guaranteed commitments. ¹⁵¹³
EMEA	Europe, Middle East, and Africa
Facebook Audience Network ("FAN")	Facebook product that facilitated advertising transactions to open-web publishers until 2020. Now known as Meta Audience Network, focused on advertising on Meta O&O properties and select third-party mobile apps. ¹⁵¹⁴
First-party data	First-party data is information customers have consented to provide, like an email address or phone number that your business directly collects and owns. ¹⁵¹⁵
GAIA	Google Accounts and ID Administration. The user profile based on data collected from a signed-in user on Google Search, YouTube Maps and Play Store that "is used to serve ads to the relevant user on Google's O&O properties." ¹⁵¹⁶
Google Ad Manager ("GAM")	A Google product that contains both DFP and AdX.
Google Campaign Manager ("GCM")	Google's advertiser ad server, formerly known as DoubleClick Campaign Manager or DoubleClick for Advertisers. ¹⁵¹⁷ GCM includes tools for trafficking, reporting, attribution, and verification, allowing advertisers to manage digital campaigns across both web and mobile platforms. ¹⁵¹⁸
Google Content Network ("GCN")	GCN stands for Google Content Network, which changed to Google Display Network in June 2010. ¹⁵¹⁹
GDA	Google Display Ads. ¹⁵²⁰
Google Display Network ("GDN")	Google's display ad network, formerly referred to as Google Content Network ("GCN"). GDN consists of an advertiser-facing component, known as Google Ads, and a publisher-facing component, known as AdSense.

¹⁵⁰⁸ Deposition of Jim Giles (Google), November 6, 2020, 84:10–86:7

¹⁵⁰⁹ Section II.B.2

¹⁵¹⁰ Section II.C.4.

¹⁵¹¹ GOOG-AT-MDL-006218271, at -285.

¹⁵¹² Section II.E.4.

¹⁵¹³ Section II.E.2.

¹⁵¹⁴ Section II.B.2.b.

¹⁵¹⁵ Google, "Use first-party data to power your ad strategy," Google Ads, accessed December 21, 2023, https://ads.google.com/intl/en_us/home/privacy/strategy/

¹⁵¹⁶ GOOG-AT-MDL-006218257–300, at -293 (01/06/2023) (Google's Jan. 6, 2023 response to European Commission's RFI 10). *See also* Google, "Help Center: Cloud Connect > Google Apps, accessed December 21, 2023, https://www.google.com/support/enterprise/static/gsa/docs/admin/70/admin_console_help/cloud_google_apps.html

¹⁵¹⁷ Samantha Barnes, "Integrating Google Analytics 360 With DoubleClick Campaign Manager," Bounteous, May 2, 2017, <https://www.bounteous.com/insights/2017/05/02/integrating-google-analytics-360-doubleclick-campaign-manager/>.

¹⁵¹⁸ Section II.C.5.a.

¹⁵¹⁹ Section V.B.3.a; Google, "Introducing the Google Display Network," Inside AdWords, (June 18, 2010), <https://adwords.googleblog.com/2010/06/introducing-google-display-network.html>.

¹⁵²⁰ Section IV.B.2.b; GOOG-DOJ-AT-00330626 at -629–630.

Demand Product	Also referred to as Ad Connector or Project Yavin, a Google initiative launched in around 2018 to sell inventory to Google's demand sources, DV360 and Ads, without the use of an exchange. ¹⁵²¹
Dynamic remarketing	Dynamic remarketing allows retailers to show previous visitors ads that contain products and services they viewed on the retailer's site. ¹⁵²²
Google Publisher Tag ("GPT")	A Javascript library that publishers use to tag their web pages so they can talk to Google Ad Manager backend. ¹⁵²³
Google Analytics	A marketing analytics tool that combines advertiser data with data from Google's ad tech products to provide marketing insights. ¹⁵²⁴
Header bidding ("HB")	Header bidding allows exchanges and other indirect demand sources to compete against each other on the basis of their real-time demand, as opposed to being relegated to a waterfall where they would be ranked on the basis of historical performance. ¹⁵²⁵
IAB	Interacting Advertising Bureau. The trade association that represents the digital advertising community. ¹⁵²⁶
Impression	A single ad shown to a single web visitor. ¹⁵²⁷
Indirect transactions	A method to sell unsold inventory to a large number of buyers in "real-time" after publishers exhausted advertising sold through traditional direct deals. ¹⁵²⁸
Instream video advertising	Instream video ads are shown within a video player on a website, or in applications on mobile devices or connected TVs. Instream video ads are viewed in a video player before, during, or after the original site video content. Instream video ads are distinct from "outstream" or "in-display" video ads, which are videos played in standard display ad spaces and can be substituted in those spaces for "static" images. ¹⁵²⁹
Jedi	Google's internal name for Exchange Bidding. Also called "demand syndication." ¹⁵³⁰
Jedi Blue	"Facebook Audience Network integrated as a buyer into Open Bidding." ¹⁵³¹
LPS	LPS stands for Large Partner Sales. It is part of Google's sales organization. LPS covers Google's 100-200 largest sell-side partners. ¹⁵³²
OPG	OPG stands for Online Partnerships Group. It is part of Google's sales organization. OPG covers all but the 100-200 largest sell-side partners. ¹⁵³³
Machine learning ("ML")	Machine learning techniques include decision trees, support vector machines, neural nets, deep learning to model complex relationships. ¹⁵³⁴

¹⁵²¹ Appendix K.3. (Google employees evaluated options to "dry out" rival exchanges by adjusting DV360's bidding strategies).

¹⁵²² Google, "About dynamic remarketing: show ads tailored to your site and app visitors," Google Ads Help, <https://support.google.com/google-ads/answer/3124536?hl=en>.

¹⁵²³ GOOG-DOJ-AT-02199478, at -487 (10/26/2018).

¹⁵²⁴ Section II.C.5.b.

¹⁵²⁵ Section II.E.3.

¹⁵²⁶ Section II.A.

¹⁵²⁷ Section II.A.1. (Ad tech products for display advertising and their customers).

¹⁵²⁸ Section II.A.4.

¹⁵²⁹ Section II.A.

¹⁵³⁰ GOOG-TEX-00121384, at -384 (10/2016).

¹⁵³¹ GOOG-DOJ-AT-01491086, at Tab "Projects 2019" (06/03/2019).

¹⁵³² See GOOG-AT-MDL-006217592, at -601 (Google's Dec 12, 2022 response to European Commission's RFI 10 states, "LPS and OPG are both parts of Google's sales organization, Global Business Operations: (a) "LPS" stands for Large Partner Sales. LPS covers Google's 100-200 largest sell-side partners. (b) "OPG" stands for Online Partnerships Group. OPG covers the remaining sell-side partners.")

¹⁵³³ See GOOG-AT-MDL-006217592, at -601 (Google's Dec 12, 2022 response to European Commission's RFI 10 states, "LPS and OPG are both parts of Google's sales organization, Global Business Operations: (a) "LPS" stands for Large Partner Sales. LPS covers Google's 100-200 largest sell-side partners. (b) "OPG" stands for Online Partnerships Group. OPG covers the remaining sell-side partners.")

¹⁵³⁴ Hal R. Varian, "Big Data: New Tricks for Econometrics." *Journal of Economic Perspectives* 28, no. 2 (2014).

Native ads	Ads designed to blend in with the environment in which they are placed. ¹⁵³⁵
Net revenue	A 2019 Google presentation defines net revenue to be “booked revenue” (media spend plus buy-side fees, minus adjustments) minus the revenue share (also referred to as TAC or traffic acquisition cost) paid to the publisher. ¹⁵³⁶ A 2019 email describes net revenue to be the “gross revenue” minus TAC and buyside fees for sellside products. ¹⁵³⁷
Open Auction (“OA”)	A type of auction for indirect transactions that is conducted among a wide set of potential advertisers. ¹⁵³⁸
OTT	Over-The-Top. A service that allows television content to be delivered over the Internet, bypassing traditional TV distribution. This is content “over the top” of the set-top box. ¹⁵³⁹
O&O	Owned and operated ¹⁵⁴⁰
Outstream	Videos played in standard display ad spaces that can be substituted in those spaces for “static” images. ¹⁵⁴¹
Partner Business Solutions (“PBS”)	A Google service that participates in monetization via AdX Video, ad serving via DFP Video, and dynamic ad insertion via SmartStream. ¹⁵⁴²
pHOB	Predicted highest other bid
Preferred deal (“PD”)	A type of programmatic direct transaction where a publisher and an advertiser negotiate on the price for inventory that the advertiser can optionally buy. The advertiser has a “preferred” opportunity to buy the inventory at the negotiated price when there is an ad request for that specific inventory, but is not committed to do so; moreover, the inventory is not guaranteed to be available for the advertiser. ¹⁵⁴³
Programmatic guaranteed (“PG”)	A type of programmatic direct transaction where one advertiser and one publisher agree on a fixed price for ad inventory that is then reserved (guaranteed) for the given buyer. ¹⁵⁴⁴
Project Poirot	A Google program first launched in 2017. Involved “bid shading,” or reducing advertisers’ bids, into ad exchanges that DV360 detected to be deviating from a second-price auction. ¹⁵⁴⁵
Private Auction	A type of auction for indirect transactions that is only open to specific buyers, allowing publishers to control which advertisers are able to bid on their ad inventory. ¹⁵⁴⁶
Programmatic direct	A transaction type that allows publishers to “negotiate direct-sold campaigns while taking advantage of programmatic technology.” ¹⁵⁴⁷
Project Bell	A Google program launched in October 2016 as an update to Project Bernanke (adjusting Google Ads’ targeted margins when bidding into AdX). ¹⁵⁴⁸
Publisher Ad Server	Software products used by open-web publishers to manage and sell display ad “inventory” (i.e., website ad slot) through transactions that are directly negotiated with advertisers in advance and “indirect” transactions that are sold in “real-time” whenever a user visits a website and new display ad impressions are available for sale. ¹⁵⁴⁹

¹⁵³⁵ Section II.A.

¹⁵³⁶ GOOG-AT-MDL-003567004, at -006 (11/19/2019).

¹⁵³⁷ GOOG-AT-MDL-003566654, at -655 (06/28/2019).

¹⁵³⁸ Section II.A.4.

¹⁵³⁹ Google, “OTT (Over-The-Top)”, Authorized Buyers Help, accessed December 20, 2023, <https://support.google.com/authorizedbuyers/answer/7049047?hl=en>.

¹⁵⁴⁰ GOOG-AT-MDL-006218271, at -293 (01/06/2023).

¹⁵⁴¹ Section II.A.

¹⁵⁴² GOOG-TEX-00035744, at -783 (07/30/2014).

¹⁵⁴³ Section II.A.4.

¹⁵⁴⁴ Section II.A.4.

¹⁵⁴⁵ Appendix L.3.b.

¹⁵⁴⁶ Section II.A.4.

¹⁵⁴⁷ Section II.A.4.

¹⁵⁴⁸ Appendix L.4.b.

¹⁵⁴⁹ Section II.B.1.

Retargeting ads	Advertisements that target consumers who have previously visited a website. Retargeting display ads appear on other web sites that the consumer subsequently visits. ¹⁵⁵⁰
ROI	Return on Investment
Real time bidding (RTB)	The process by which a demand source is able to submit a bid for publishers' ad inventory at the impression (or "query") level and is not restricted to being able to purchase inventory at a predetermined price. ¹⁵⁵¹
Search ads	Search ads are ads shown alongside search results from a search engine and are often linked to a certain search word or phrase. ¹⁵⁵²
Smart Bidding	Smart Bidding refers to bid strategies on Google Ads that optimize for conversions or conversion value. ¹⁵⁵³ Smart Bidding often allows Google Ads' bids to exceed the maximum set by the advertiser for individual auctions so long as Google Ads remains below the maximum on average. ¹⁵⁵⁴
Social media (in-feed social) ads	Social media (or "in-feed social") ads appear in social media feeds and closely resemble organic posts on those sites. ¹⁵⁵⁵
Soft floor	A price above the hard floor which determines the auction format that is used to sell the impressions. If the highest bid exceeds the soft floor, the impression is sold through a second price auction, with the highest bidder paying the larger of the second-highest bid or the soft floor. ¹⁵⁵⁶
Supply-side-platform ("SSP")	Previous name for ad exchanges. ¹⁵⁵⁷
Sponsored Product/Sponsored Listing ads	Ads that promote specific products alongside "organic" product listings on e-commerce sites within search results or in suggested product pages. ¹⁵⁵⁸
Take rate	Ad exchanges typically charge a per-transaction fee. This transaction fee is referred to as a "take rate" or "rev share," which is deducted from payment received by the exchange before being passed along to the publisher. ¹⁵⁵⁹
Third-Party Data	Data that is user information that is purchased or obtained from other sources (as opposed to first-party data as used by that first-party source). ¹⁵⁶⁰

¹⁵⁵⁰ Section II.A.3.

¹⁵⁵¹ GOOG-DOJ-03242646 at -664–65, describing real-time bidding as "the buying and selling of online media through real-time auctions" and "bought in real-time, at a variable price.").

¹⁵⁵² Section II.A.

¹⁵⁵³ Google, "About Smart Bidding," Google Ads Help, accessed December 21, 2023, <https://support.google.com/google-ads/answer/7065882?hl=en>.

¹⁵⁵⁴ Google, "About Target CPA bidding," Google Ads Help, accessed December 21, 2023, <https://support.google.com/google-ads/answer/6268632?sjid=6084683694443905429-NA>.

¹⁵⁵⁵ Some in-feed ads can also be shown on non-social media sites. These ads are distinct from display ads because the ad slot blends in with the publisher's content (as opposed to occupying space on top of or around it) and the ad creative matches the aesthetic of the publisher's content. See ("Native Advertising Playbook 2.0," *Internet Advertising Bureau (IAB)*, May 2019, https://www.iab.com/wp-content/uploads/2019/05/IAB-Native-Advertising-Playbook-2_0_Final.pdf). See also MMA Mobile Native Advertising Committee, "The Mobile Native Ad Formats," *Mobile Marketing Association*, accessed December 20, 2023, https://www.mmaglobal.com/files/documents/the_mobile_native_formats_final.pdf (distinguishing between in-feed (social) and in-feed (content)). In-feed ads can require substantial technical capability and be limited to more sophisticated publishers (see GOOG-AT-MDL-000994606 at -669 (07/19/2019) ("Creating a good looking, high performing native ad requires effort and skill. We strongly encourage publishers to use our templates as a starting point and to involve their design and engineering teams in the process... When a native ad is in a feed it should very closely match your site/apps layout. Plan on starting with a pre-made template but making significant edits to the CSS for layout, font, and styling."))).

¹⁵⁵⁶ Section III.E.

¹⁵⁵⁷ Section II.B.3.

¹⁵⁵⁸ GOOG-AT-MDL-000001750 at -750 (06/10/2023) ("Sponsored Product Ads (SPAs) are natively rendered, click on site ads on e-commerce publishers' sites/apps. These ads can appear in search results..., category browsing, or on product detail pages (e.g. [sic] "you may also like...")").

¹⁵⁵⁹ Section II.D.

¹⁵⁶⁰ Google, "Data use in personalized ads on Google Search, Gmail and YouTube," Advertising Policies Help, <https://support.google.com/adspolicy/answer/6242605?hl=en>.

Expert Report of Robin S. Lee, PhD

UFPA	Unified First Price Auction. ¹⁵⁶¹
Unified Pricing Rules (“UPR”)	A Google policy stating that publisher pricing rules “will be applied to all partners equally, and cannot be set for individual buying platforms.” ¹⁵⁶²
Value CPM	The value CPM (cost per thousand impressions) is an amount you specify to help Google Ad Manager estimate the value of campaigns. ¹⁵⁶³
Viewed impressions	“[A]n impression-level metric” wherein Google “count[s] 1 per end user who viewed the impression, even if an impression has multiple views.” ¹⁵⁶⁴
XFP	Google’s former internal name for DFP. ¹⁵⁶⁵
Yavin	Google’s internal name for Demand Product or Ad Connector. ¹⁵⁶⁶
Yield manager	Products that allowed publishers to access and select among bids from multiple demand sources. ¹⁵⁶⁷

¹⁵⁶¹ Section II.E.5.

¹⁵⁶² Jason Bigler, “An update on first price auctions for Google Ad Manager,” Google Ad Manager Blog, May 10, 2019, <https://www.blog.google/products/admanager/update-first-price-auctions-google-ad-manager/>.

¹⁵⁶³ Google, “Value CPM: Learn how to estimate, set up and report on value CPM,” Google Ad Manager Help, accessed December 20, 2023 <https://support.google.com/admanager/answer/177222?hl=en>.

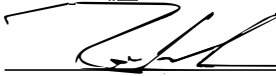
¹⁵⁶⁴ GOOG-AT-MDL-009777293, at -314 (05/19/2023).

¹⁵⁶⁵ GOOG-DOJ-06832772, at -783 (12/12/2013).

¹⁵⁶⁶ Appendix K.3.

¹⁵⁶⁷ Section VII.A.2.

Expert Report of Robin S. Lee, PhD



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December 22, 2023
Date

HIGHLY CONFIDENTIAL